

Service Manual
for the
***Kodak* Point-of-Care CR 120/140 Systems**



HEALTH GROUP

Restricted Information

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Point-of-Care CR 120/140 Service Manual

Catalog Number: 6H1344

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Use of the Guide

The *Kodak* Point-of-Care CR 120/140 System is designed to meet international safety and performance standards. Personnel operating the unit must have a thorough understanding of the proper operation of the system. This manual has been prepared to aid medical and technical personnel to understand and operate the system. Do not operate the system before reading this manual and gaining a clear understanding of the operation of the system. If any part of this manual is not clear, please contact your Kodak representative for clarification.

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Section 1: Safety and Regulatory Information

Introduction

The information contained herein is based on the experience and knowledge relating to the subject matter gained by Eastman Kodak Company prior to publication. No patent license is granted by this information.

Eastman Kodak Company reserves the right to change this information without notice, and makes no warranty, express or implied, with respect to this information. Kodak shall not be liable for any loss or damage, including consequential or special damages, resulting from any use of this information, even if loss or damage is caused by Kodak's negligence or other fault.

Document Conventions

Throughout this manual the *Kodak Point-of-Care CR 120/140 Systems* will be referred to as the *Point-of-Care CR 120/140*.



Caution

Cautions point out procedures that you must follow precisely to avoid damage to the system or any of its components, yourself or others, loss of data or corruption of files in software applications.



Note

Notes provide additional information, such as expanded explanations, hints, or reminders.



Important

Important highlights critical policy information that affects how you use this guide and this product

General Safety Guidelines

- This product is designed and manufactured to ensure maximum safety of operation. Operate and maintain it in strict compliance with the safety precautions and operating instructions contained in this guide.
- This product meets all the safety requirements applicable to medical equipment. However, anyone attempting to operate the system must be fully aware of potential safety hazards
- There are no user serviceable parts in this system. The product must be installed, maintained, and serviced by qualified service personnel according to procedures and preventive maintenance schedules in the product service guide. If your product does not operate as expected, contact your Service Representative.
- Do not modify this product in whole or in part without prior written approval from Eastman Kodak Company.
- Personnel operating and maintaining this system should receive training and be familiar with all aspects of operation and maintenance.
- To ensure safety, read all user guides carefully before using the system and observe all Cautions, "Important", and Notes located throughout the guide.
- Keep this guide with the equipment. Reading this guide does not qualify you to operate, test, or calibrate this system.
- Unauthorized personnel are not allowed access to the system.
- If the product does not operate properly or fails to respond to the controls as described in this guide:
 - Follow the safety precautions as specified in this guide.
 - Stop using the system and prevent any changes to it.
 - Immediately contact the service office, report the problem, and await further instructions.
- Use only legally marketed cassettes. Check periodically the quality of the cassettes, and replace if any defects are apparent.
- The images provided by this system are intended as tools for the trained user. They are explicitly not to be regarded as a sole incontrovertible basis for clinical diagnosis.

- Be aware of the product specifications and of system accuracy and stability limitations. Consider these limitations before making any decision based on quantitative values. If you have any doubts, consult your Sales Representative.
- This system is Class I continuous operated stationary equipment without applied parts and has one signal input/output part.

Electrical Hazards



Caution

- Do not remove or open system covers or plugs. Internal circuits use high voltage capable of causing serious injury.
- Fuses blown within 36 hours of being replaced by a qualified technician may indicate malfunctioning electrical circuits within the system. Have the system checked by qualified service personnel. Do not attempt to replace any fuse.
- Fluids that seep into the active circuit components of the system may cause short circuits that can result in electrical fires. Therefore, do not place any liquid or food on any part of the system.

Explosion and Implosion Hazards



Caution

- Do not operate the equipment in the presence of explosive liquids, vapors, or gases.
- Do not plug in or turn on the system if hazardous substances are detected in the environment. If these substances are detected after the system has been turned on, do not attempt to turn off the unit or unplug it. Evacuate and ventilate the area before turning off the system.

Overheating

Do not block the air circulation around the unit. Always maintain at least 6 inches (15 cm) clearance around the unit to prevent overheating and damage to the system

Recycling the Unit



In the European Union, this symbol indicates that when the last user wishes to discard this product, it must be sent to appropriate facilities for recovery and recycling.

Contact your local Kodak representative or refer to www.kodak.com/go/recycle for additional information on the collection and recovery programs available for this product.

IEC Symbols Used

The system may have labels with one or more of the following symbols. These symbols indicate the IEC standards to which the system conforms.



Warning, Caution – consult accompanying documents



Power on



Power off



Caution – Electrical shock hazard

Device-Specific Safety Information



LIFTING HAZARD

The Point-of-Care CR 120/140 unit weighs 18 kg (39.6 lb). Do not try to lift the unit by yourself. Always seek assistance from another person. Lifting equipment that is too heavy may result in serious injury and/or damage to equipment

Laser Safety Instructions



Caution

- The Point-of-Care CR 120/140 is a Class 1 Laser product.
- During normal operation, always keep the unit enclosed in its protective cover to prevent the outside area from being exposed to laser emission.
- During normal operation, do not remove the cover. Only a qualified technician may remove the cover to service this product.
- Laser radiation when cover removed. Avoid direct exposure to beam. Class 3B laser inside.
- Do not operate the system while the access door is open.
- When the laser must be operated with cover open, proper eye protection must be worn by all personnel in the area. The required laser safety eyewear must be intended for HeliumNeon/PDT lasers, have an optical density of 4-5 at wavelengths of 610-695 nm, and be marked as having CE approval.

Regulatory Information

This Product conforms to the following safety standards: IEC 601-1 Medical Electrical Equipment General Requirements for Safety, EN60601-1-2 Medical Electrical Equipment Electro-Magnetic Compatibility Requirements and Tests, IEC 60825-1 Safety of Laser Products.

This device complies with 21CFR 1040.10.

CE Conformity

This product conforms to the requirements of council directive 93/42/EEC. The Point-of-Care CR 120/140 is a Class I medical device. The Point-of-Care CR 120/140 bears the following mark of conformity.



Authorized European Representative

Kodak GmbH

Product Safety

70327 Stuttgart, Germany

Telephone: 49-711-406-2993

The FDA cleared the system for sale in the USA.

Section 2: System Description

Introduction

Throughout this manual the *Kodak* Point-of-Care CR 120/140 Systems will be referred to as the Point-of-Care CR 120/140.

The Point-of-Care CR 120/140 is designed for the reading of phosphor x-ray plates (CR) by medical professionals.

The system consists of the Point-of-Care CR 120/140 unit and the software package that includes:

- The *Kodak* QC software that operates the unit.
- An image viewing and archiving software package that supports the DICOM 3.1 standard and was approved by Eastman Kodak Company.
- The system features 8 x 10 in.; 10 x 12 in.; 14 x17 in.; 9.5 x 9.5 in. digital image reading and viewing archive.

Operational Principles

The Point-of-Care CR 120/140 is a digital imaging system for image acquisition and processing of static projection radiography that uses a phosphor plate with energy storage capability as an x-ray image receptor.

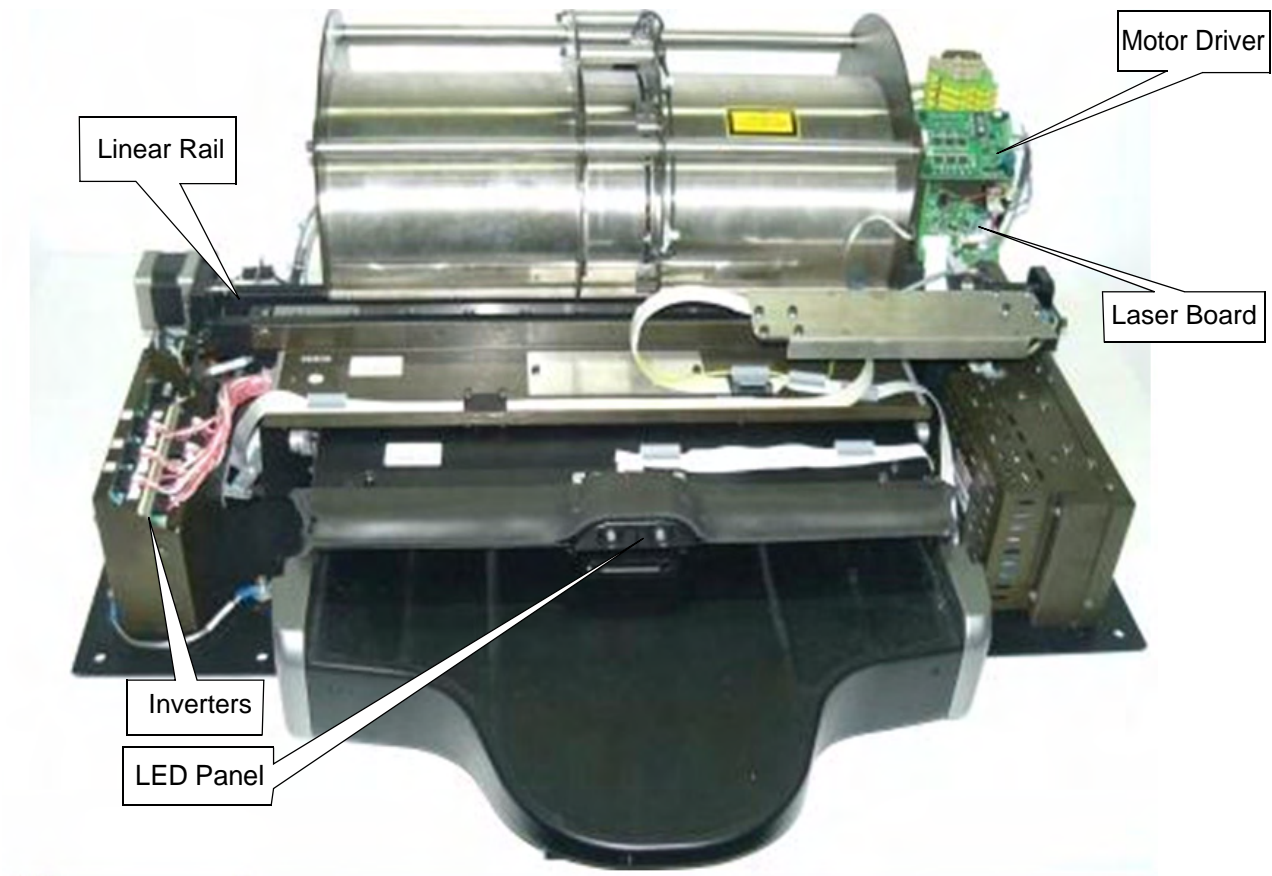
After exposure, a laser beam, which stimulates luminescence proportional to the local x-ray exposure, reads the plate. The luminescence signal is digitized. The data is then subjected to digital image processing.

The Point-of-Care CR 120/140 enables the user to read a plate quickly, and erase it to be ready for the next scan. The unit is compact and easy to use.

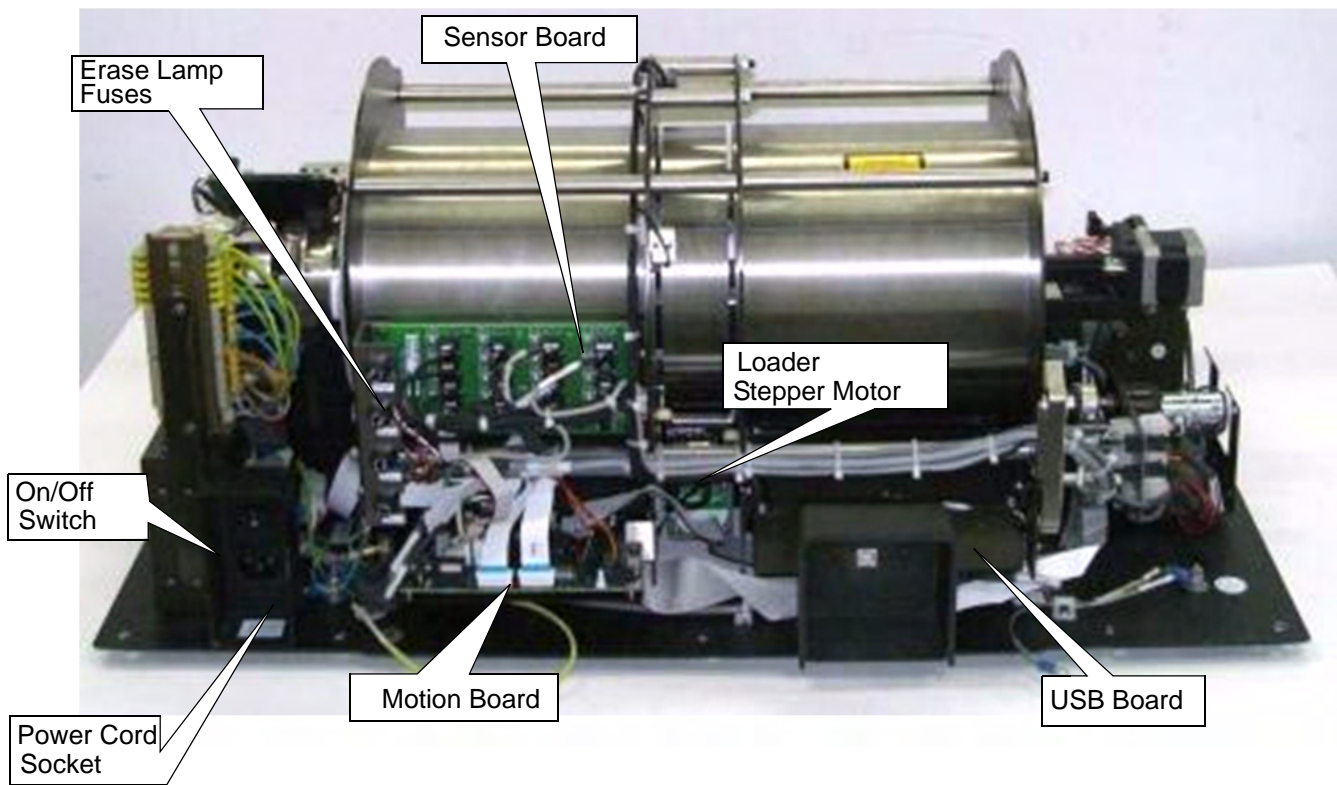
Using the Point-of-Care CR 120/140 enables medical professionals to “go digital” without changing their work practices or x-ray equipment

Views of the Unit

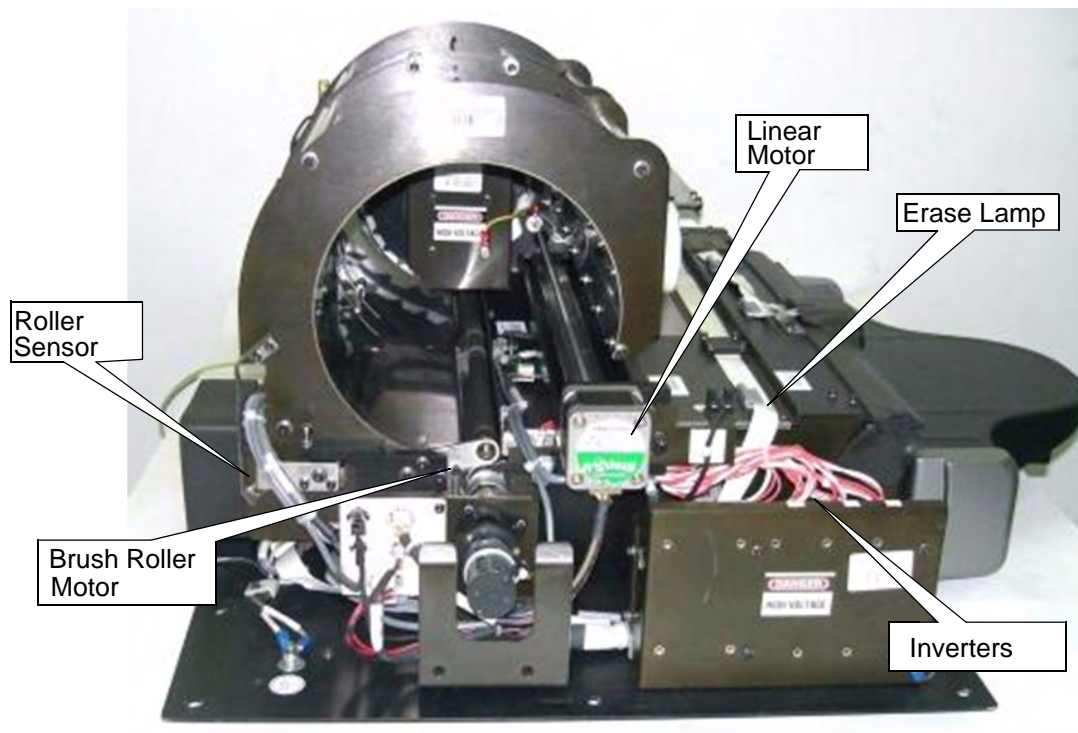
Unit Front View



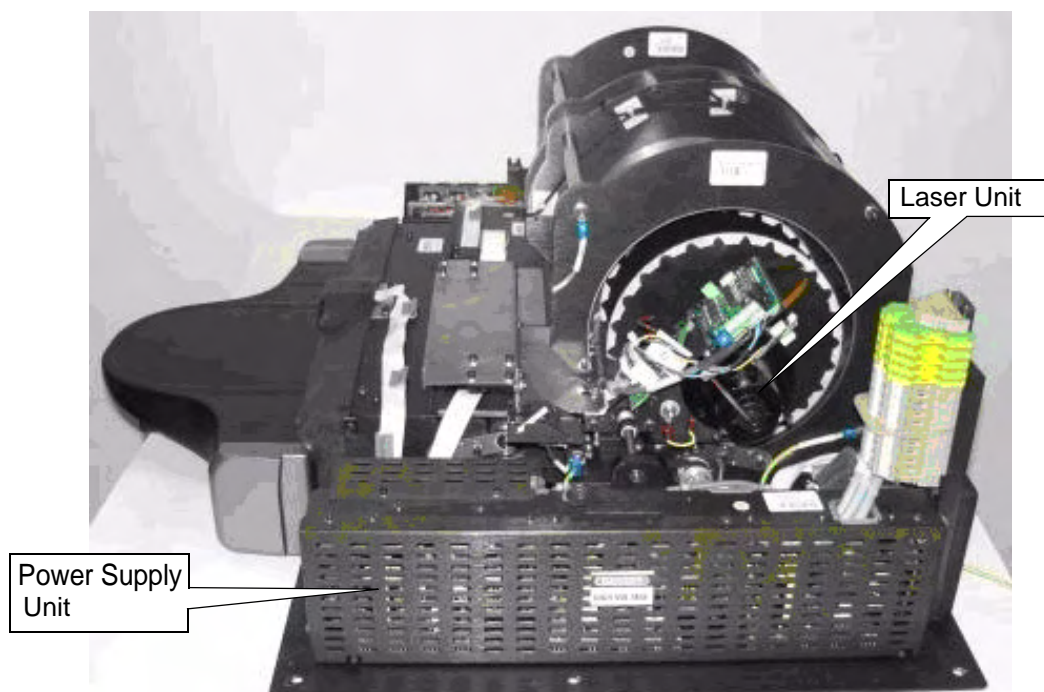
Unit Rear View



Unit Left View



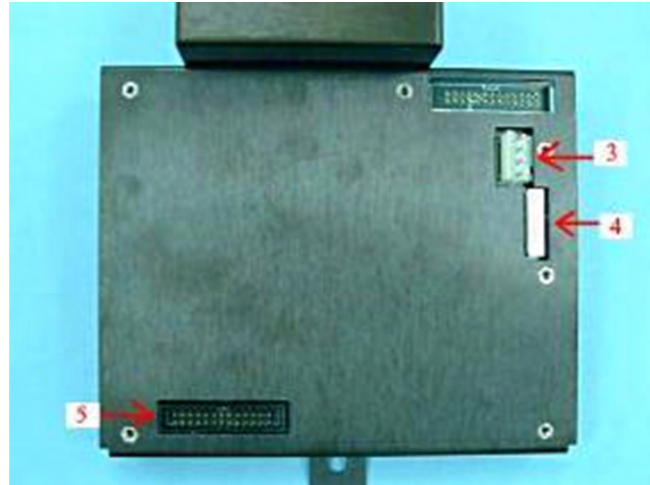
Unit Right View



USB Board

The USB Board receives operational commands from the host PC workstation via the USB port, and sends the commands to the appropriate Unit component. It also transmits image data from the Unit to the PC.

USB BOARD



USB Board Connections

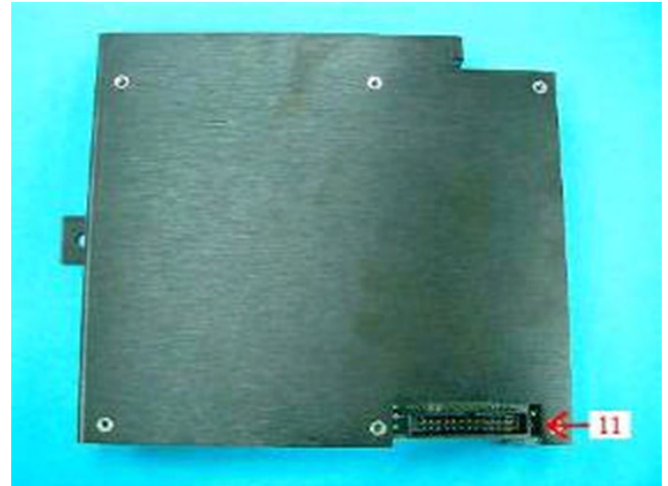
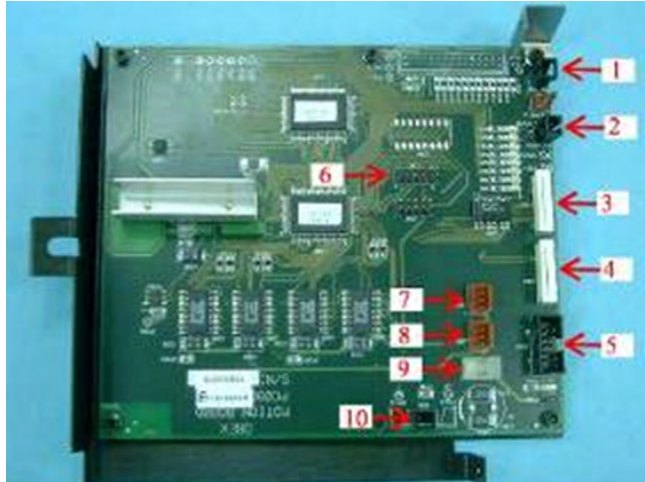
Connector	Destination		
Connector 1	USB Connector on PC		
Connector 2	Serial EPROM		
Connector 3 J305	5 V/12 V Power Supply		
	1	Red	5 V
	3	Black	GND
	4	Yellow	12 V
Connector 4 J300	Flat cable to J1 on PM Board		
Connector 5 J304	Flex cable to J200 on Motion Board		

Motion Board

The Motion Board has the following functions:

- Controls the Loader and Roller Motors
- Controls the Erase Lamps
- Reads the Unit sensors and passes the information to the USB Board

Motion Board



Motion Board Connections

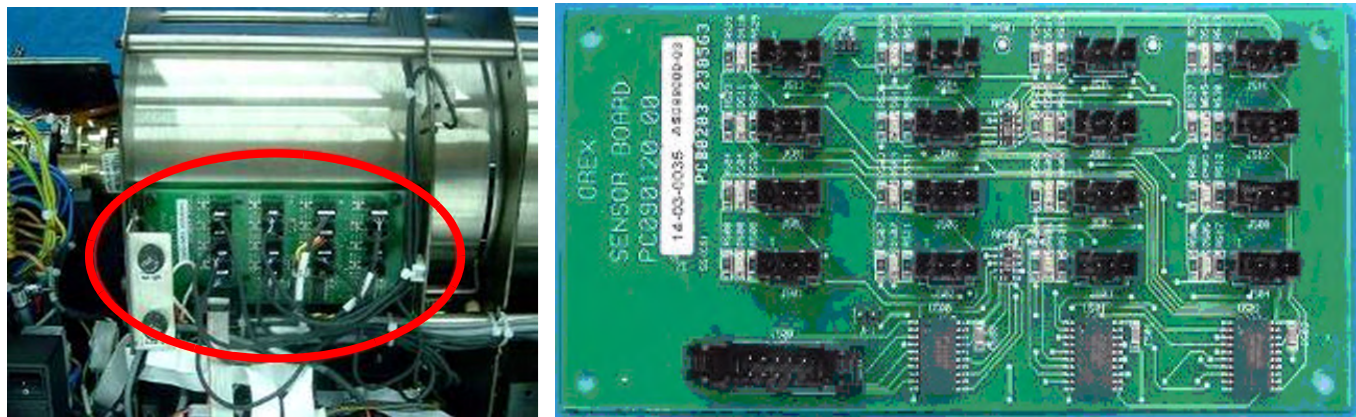
Connector	Destination		
Connector 1 J208	J500 on Sensor Board		
Connector 2 J203	J401 on Laser Board		
Connector 3 J205	J1 on Front Panel LED Board		
Connector 4 J213	12 V Power Supply		
	1	orange	12 V
Connector 5 J206	Connectors Panel (Rollers Motor)		
	1	orange	12 V
	2	brown	GND
	Rollers forward +12 V		
	Rollers backwards -12 V		
Rollers stop 0 V			
Connector 6 J202	J2 on Enhanced Motion Board		
Connector 7 J204	Loader		
	Orange + blue	130 Hz	load/unload
	Red + yellow	130 Hz	load/unload
Connector 8 J201	Connectors Panel to Stepper Motor		
	Yellow + black	11 KHz moving left/right; 0 KHz stop	
	Blue + white	11 KHz moving left/right; 0 KHz stop	
Connector 9 J211	15 V Power Supply		
	1	black	GND
	2	red	15 V
Connector 10	5 V Power Supply		
	1	black	GND
	2	red	5 V
Connector 11	J302 on USB Board		

Sensor Board

Connections

The Sensor Board is a through board used to connect the sensors to the Motion Board.

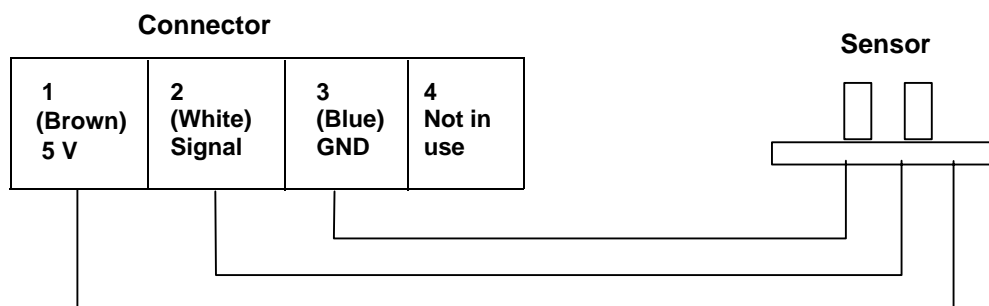
Sensor Board



Sensor Board Connections

J513 Cassette Presence Sensor	J514 Cassette Lock Sensor	J515 Right Limit Sensor	J516 Left Limit Sensor
J509 Roller Sensor	J510	J511 W0 Sensor	J512
J505 Sensor 1 on the Drum	J506 Sensor 2 on the Drum	J507 Sensor 3 on the Drum	J508 Loader Sensor in Back Position
J501 Sensor 4 on the Drum	J502 Sensor 5 on the Drum	J503	J504
J500 To J208 on Motion Board			

Typical Sensor Connections



Sensor Wiring Colors

Sensor	Wire No.	Wire Color	Signal
Sensor On (Flag in Sensor)	1	Brown	5 V always
	2	White	0 V
	3	Blue	GND always
	4	Not in use	
Sensor Off (Flag not in sensor)	1	Brown	5 V always
	2	White	5 V
	3	Blue	GND always
	4	Not in use	

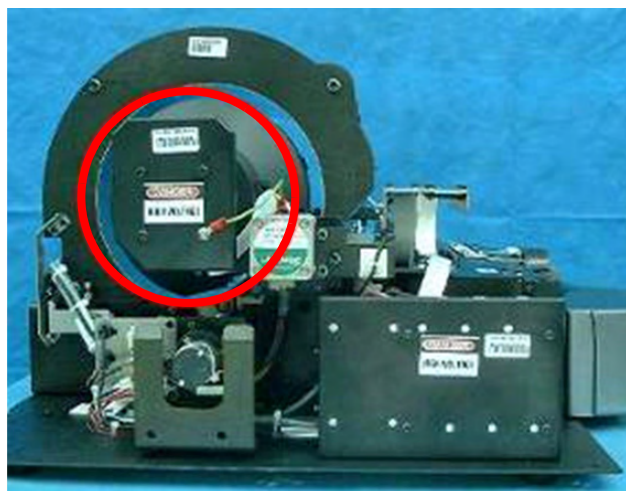
Measuring voltage:

1. All sensors except J511: measure between pin 2 & 3 and insert object between sensors.
2. For J511 only: measure between pin 2 & pin 3 from different sensor and insert cassette to system. The voltage should be between 4.5 - 5 V.

PM Assembly

The Photo Multiplier (PM) Tube collects the photons emitted from the plate.

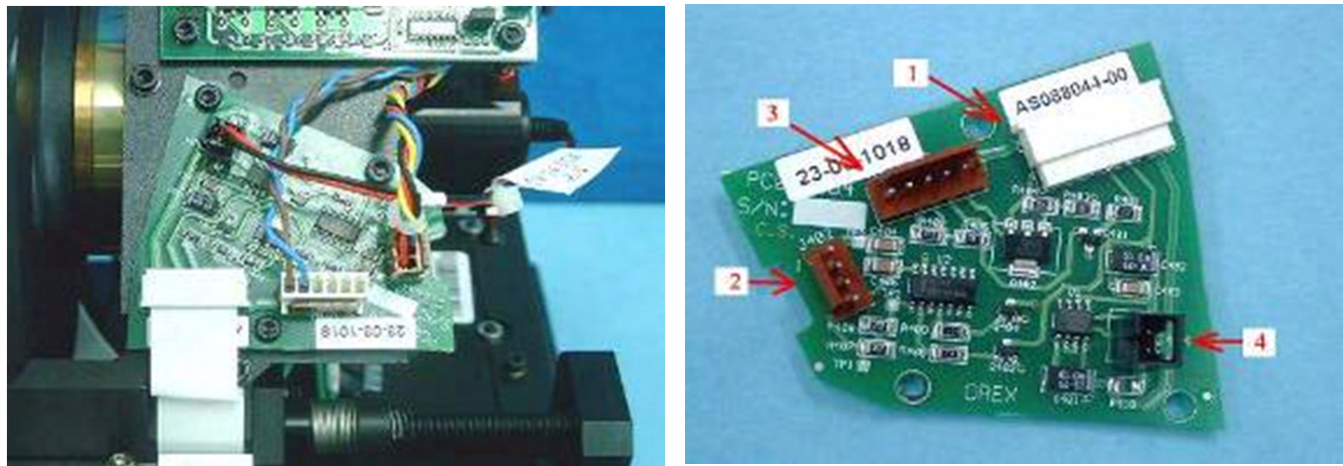
PM and PM Board



Laser Board

The Laser Board connects the laser to other major components.

Laser Board



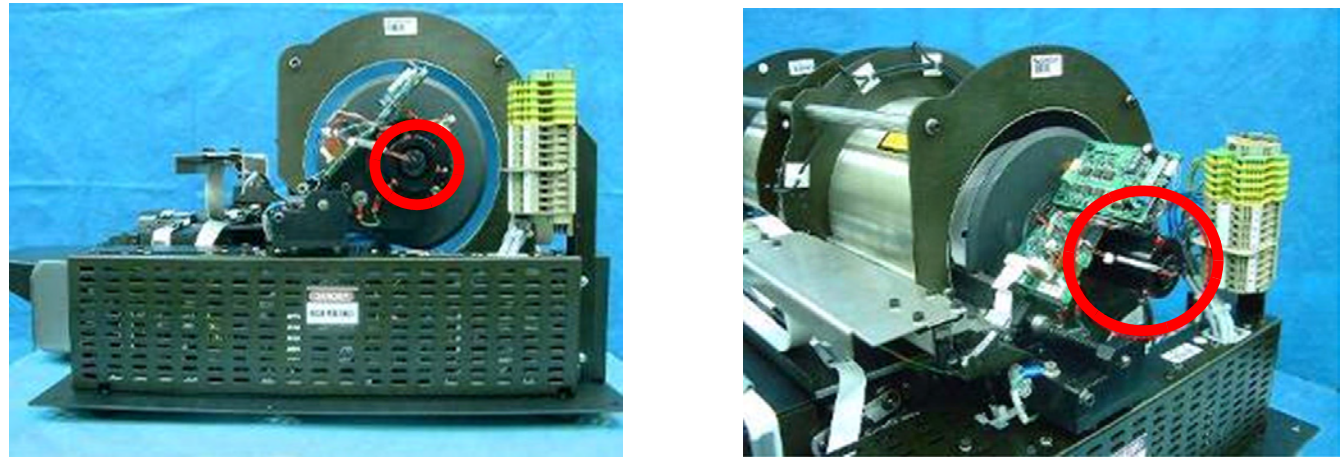
Laser Board Connections

Connector	Destination			
1	J203 on Motion Board			
2	Encoder Reader			
	1	Red	GND	
	2	Black	Index	41 ±0.5 Hz
	3	Blue	Encoder	41 ± 0.5 KHz
	4	Yellow	5 V	
3	Rotation Motor Board			
	1	Brown	GND	
	2	Blue	12 V Rotation Motor - On	
4	Laser Assembly			
	1	Red	Laser On 3.3 V	
	2	Black	GND	

Laser

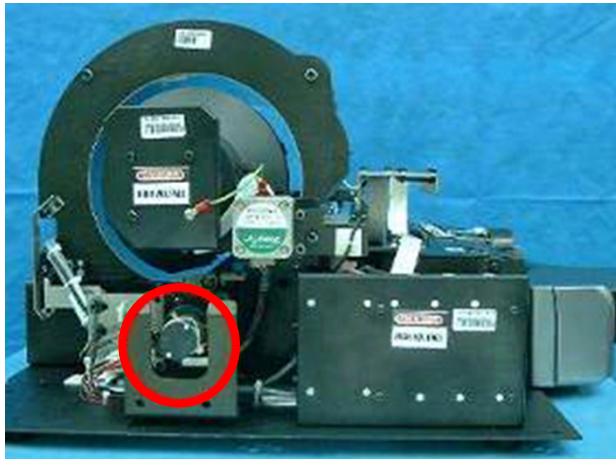
The Laser Tube emits the light to energize the phosphorus plate.

Laser

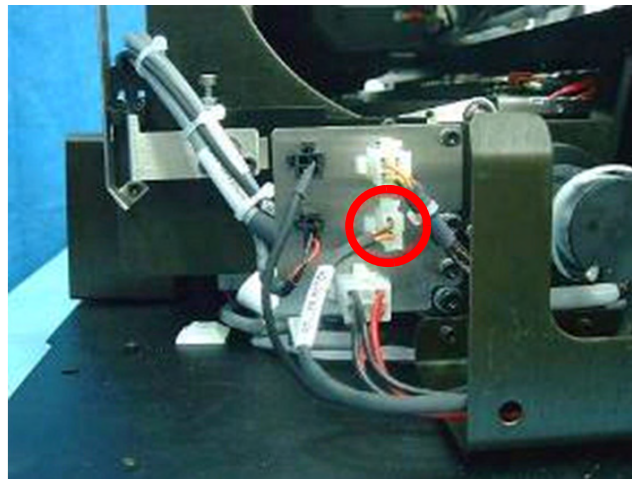


Roller Motor

Roller Motor



Roller Motor Connector



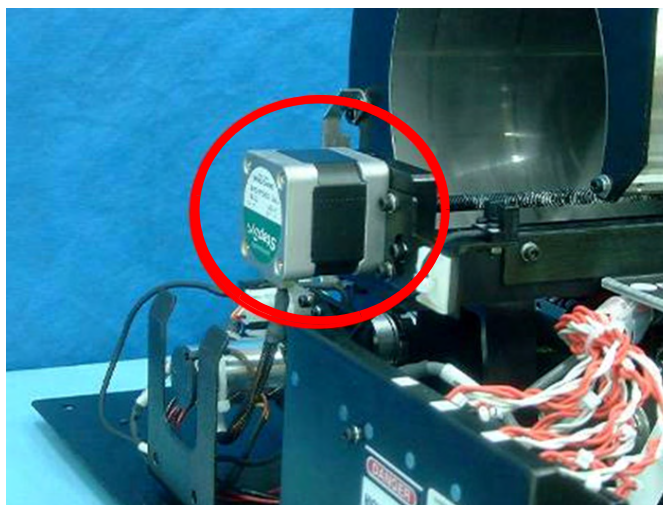
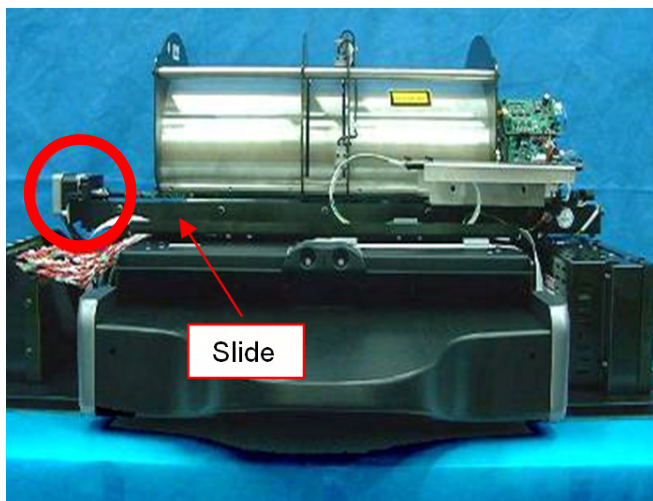
Roller Motor Connector

Connector Panel to the Roller Motor		
1	Orange	Rollers forward +12 V Rollers backwards -12 V Rollers stop 0 V
2	Brown	GND

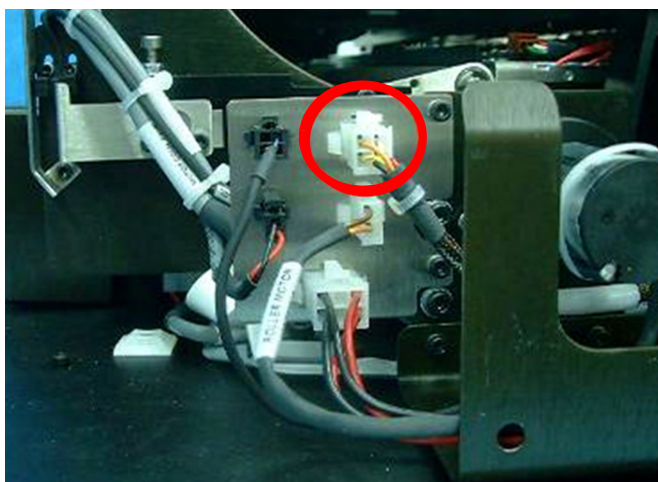
Slide Stepper Motor

The Slide Stepper Motor turns a threaded shaft which moves the PM assembly from side to side along its slide.

Slide Stepper Motor



Slide Stepper Motor Connector



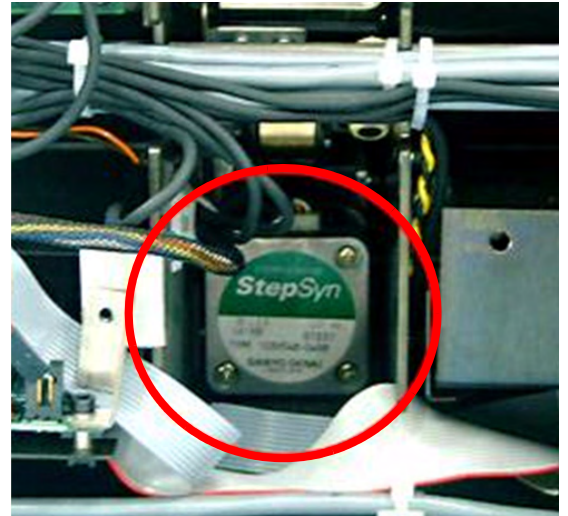
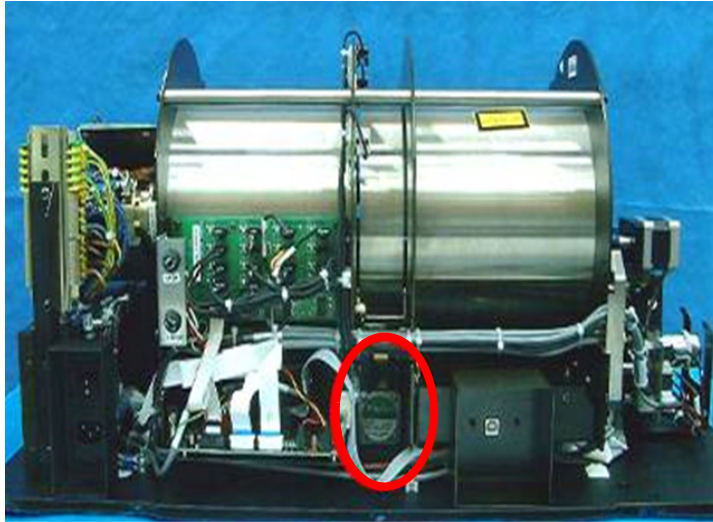
Slide Stepper Motor Connector

Connector Panel to the Stepper Motor	
Yellow + black	11 KHz moving left/right 0 KHz stop
Blue + white	11 KHz moving left/right 0 KHz stop

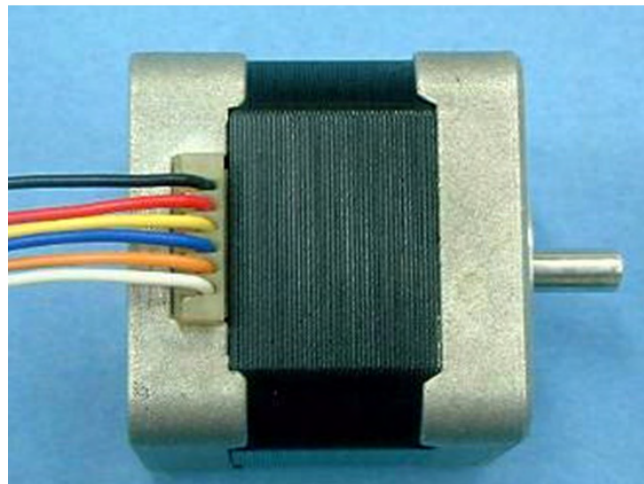
Carriage Stepper Motor

The Carriage Stepper Motor operates the mechanism which extracts the CR plate from the cassette.

Carriage Stepper Motor



Carriage Stepper Motor Wiring



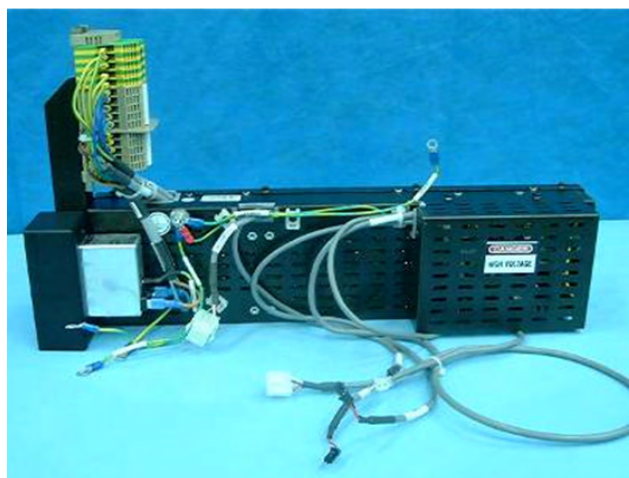
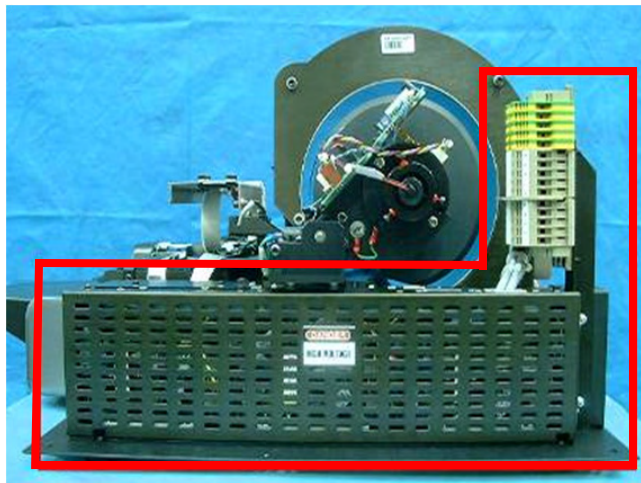
Carriage Stepper Motor Wiring

J204 on Motion Board	
Orange + blue	130 Hz load/unload
Red + yellow	130 Hz load/unload

Power Supply Assembly

The AC/DC Power Supply provides DC power to the components of the unit.

Power Supply Assembly



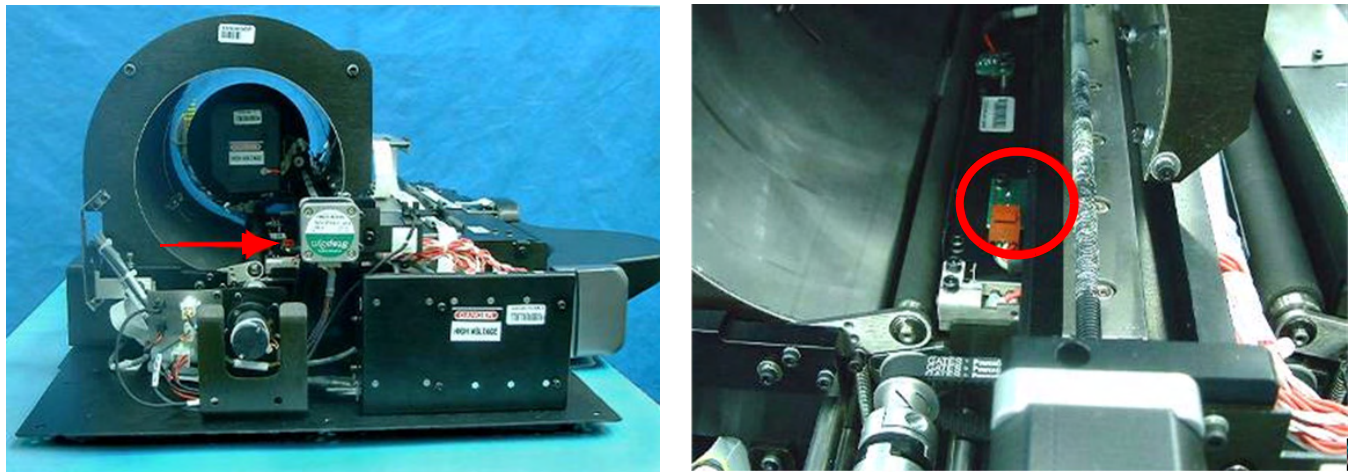
Power Supply Connectors

Connector	Destination		
P1	Source: AC INPUT POWER		
P2	CB 090065_a Destination: J211 on Motion Board		
	1	Red	15 V
	2	Black	GND 0 V
P3	CB 090064_a Destination: U201 on Motion Board		
	1	Red	5 V
	2	Black	GND 0 V
P4	CB 090071 Destination: J213 on Motion Board		
	1	Red	12 V
	2	Black	GND 0 V
P5	CB 090064_b Destination: J305 on USB Board (power input)		
	1	Red	5 V
	2	White	12 V
	3	Black	GND 0 V
P6	CB 090065_b Destination: Fuses Connector		
	1	Red	15 V
	2	White	12 V
	3	Green	GND 0 V
	4	Black	GND 0 V

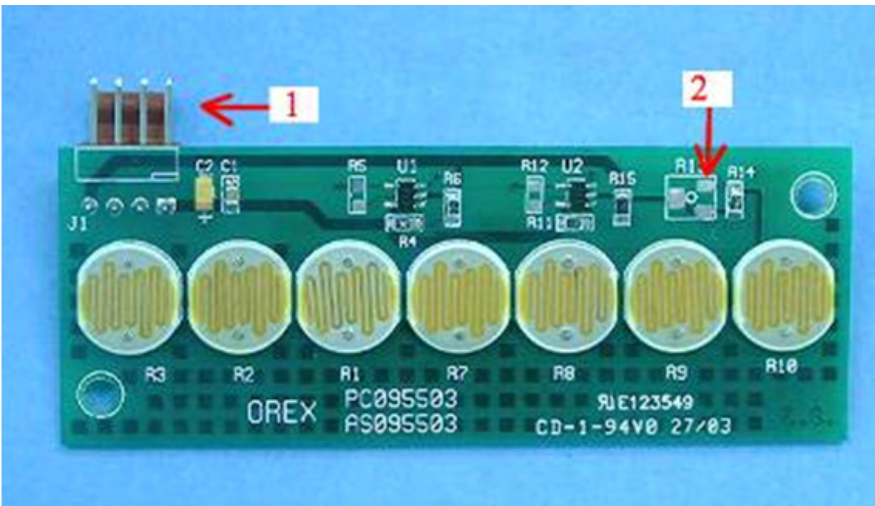
Erase Lamp Sensor

The Erase Lamp Sensor detects an Erase Lamp failure.

Erase Lamp Sensor



Erase Lamp Sensor Connectors

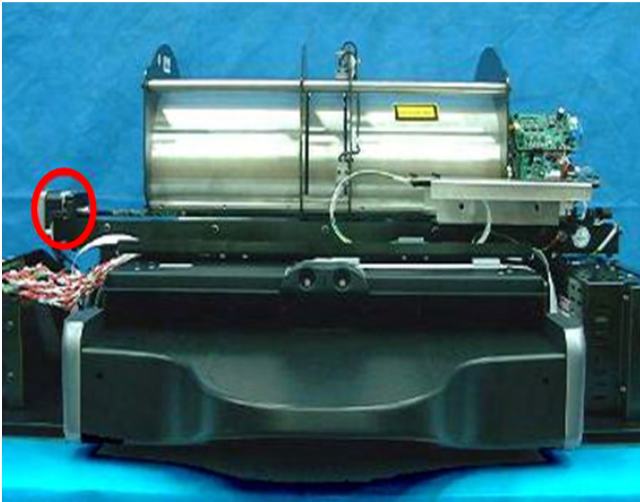


Erase Lamp Sensor Voltages

1	Connected to Erase Lamp Board		
	1	Red	5 V
	4	Black	
2	Test Point		
		Dark	0 V
		Light	3 V
	Voltage decreases when lamps fail		

Left Limit Sensor

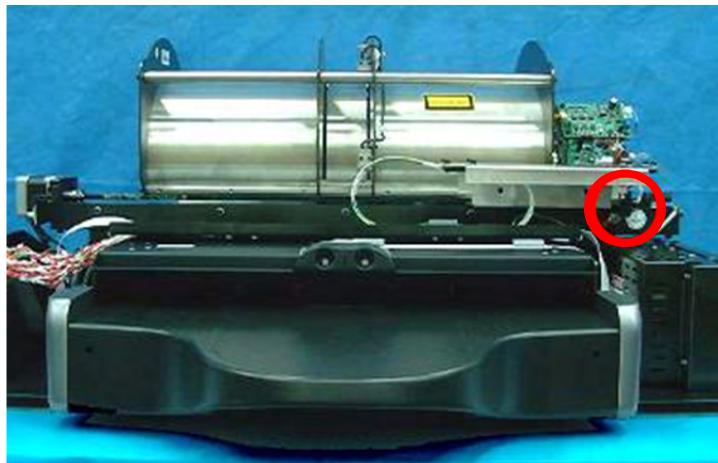
Left Limit Sensor



Refer to [“Sensor Board Connections” on Page 20](#) for information on wiring connections.

Right Limit Sensor

Right Limit Sensor

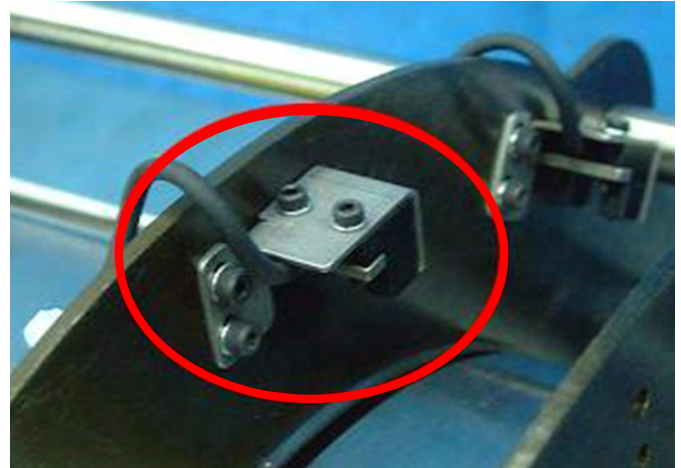
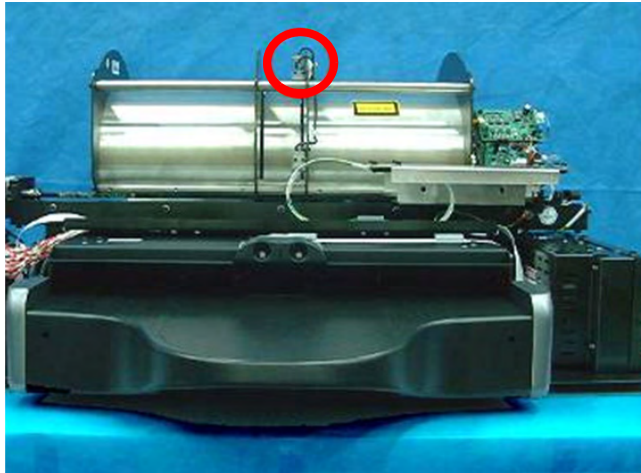


Refer to [“Sensor Board Connections” on Page 20](#) for information on wiring connections.

Plate Size Sensor

There are 4 Plate Size Sensors which determine the size of the CR plate by the location of the plate guide which is positioned by the plate as it is inserted into the drum.

Plate Size Sensor

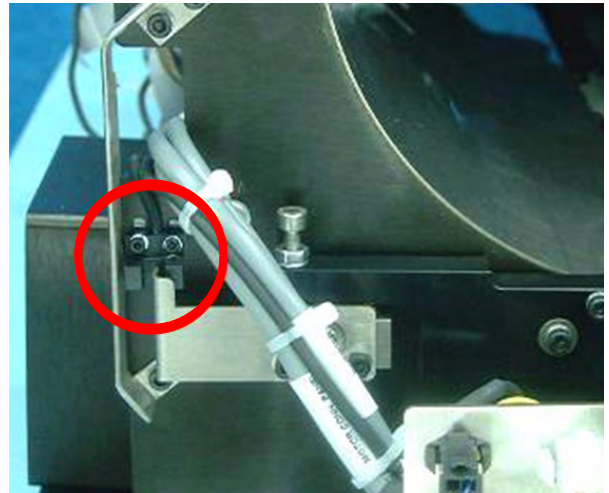
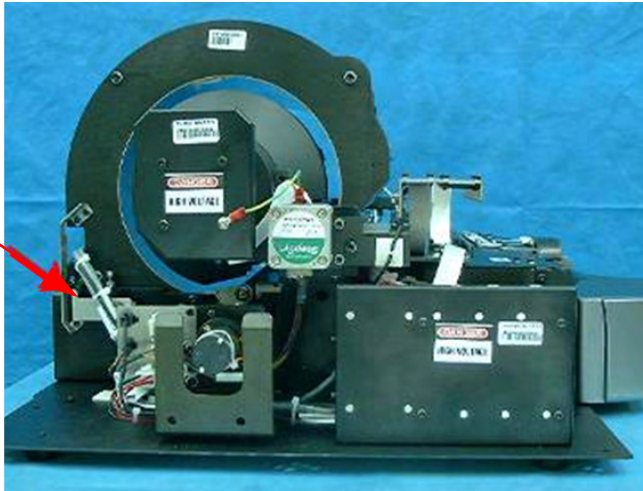


Refer to [“Sensor Board Connections” on Page 20](#) for information on wiring connections.

Roller Sensor

The Roller Sensor detects when the plate enters and exits the rollers.

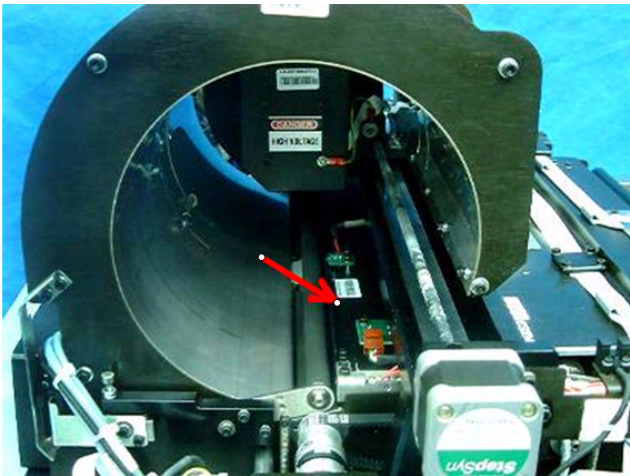
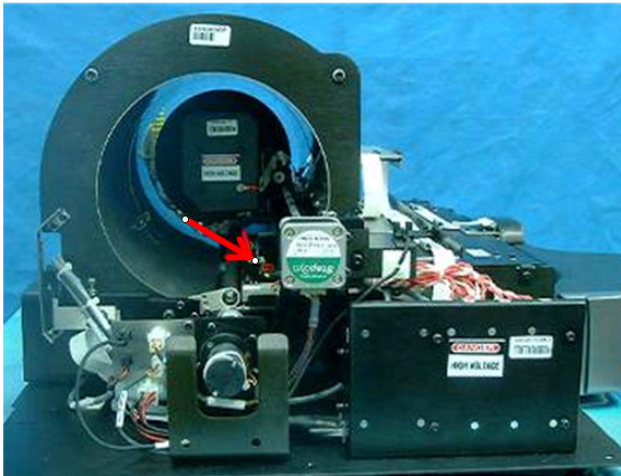
Roller Sensor



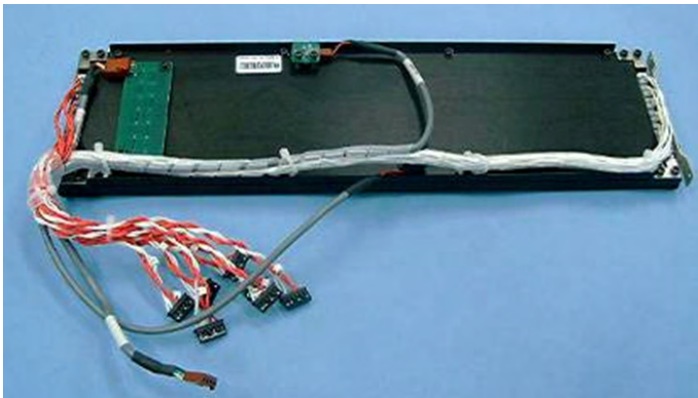
Erase Lamps

The Erase Lamps brightly illuminate the CR plate to erase the image so that the plate is ready to be used again.

Erase Lamps



Erase Lamp Assembly



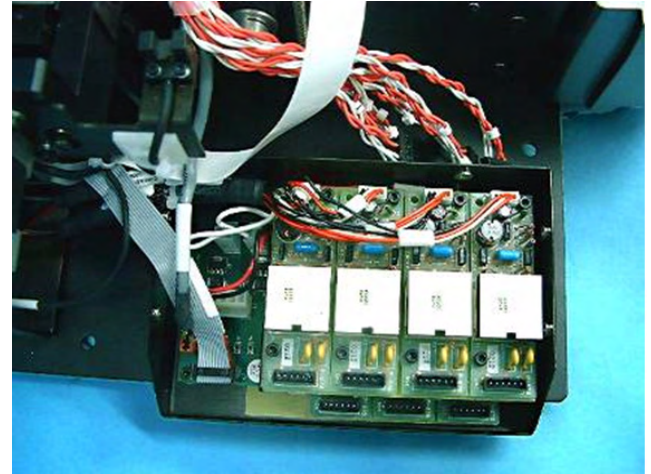
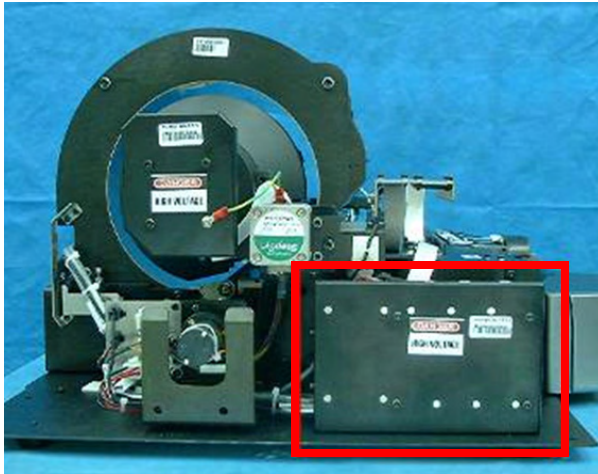
Erase Lamp Voltages

Connector	Destination		
1	Connectors panel		
	1	Red	5 V
	2	Black	GND 0 V
2	CB090069 Destination: Erase lamps board		
	1	Red	5 V
	2	White	Lamp on 0 V Lamp off 2.5-5 V
	3	Green	Lamp on 0 V Lamp off 2.5-5 V
	4	Black	GND
3	Inverters		
	AC high voltage		

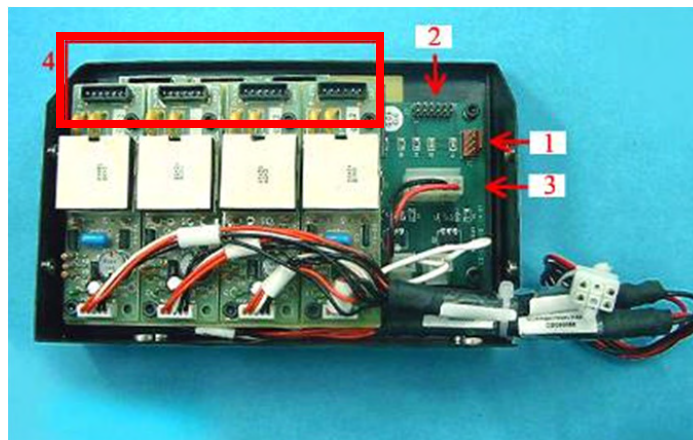
Inverter Assembly

The Inverter Assembly converts the 15 VDC input to a high voltage output to power the Erase Lamps.

Inverter Assembly



Inverter Assembly Connections



Inverter Assembly Voltages

Connector	Destination		
1	J1 ON Lamp Sensor Board		
	1	Red	5 V
	2	White	Lamp on 0 V Lamp off 2.5 - 5 V
	3	Green	Lamp on 0 V Lamp off 2.5 - 5 V
	4	Black	GND
2	J202 on motion board		
3	P2 on 15 V power supply		
	1	Red	15 V
	2	White	GND
4	AC - High voltage to Erase Lamps		

Section 4: Replacing Components

Introduction

In order to replace components in the unit, the main cover must be removed. If the unit is operated without the cover the following laser precautions must be taken.



Laser Warning

To avoid possible eye damage, before operating the unit without the cover, disconnect the laser (see page 37). For additional laser precautions see ["Laser Safety Instructions" on Page 11](#). Only authorized personnel may remove the cover.



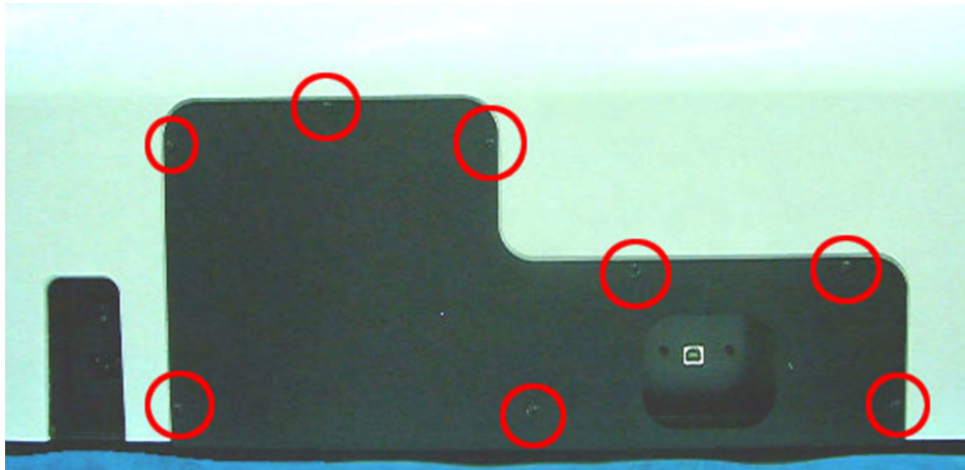
Laser Warning

Do not operate the unit while the laser is connected without proper eye protection. Safety glasses, (see ["Laser Safety Instructions" on Page 11](#)) must be worn by all personnel in the area of the unit! Authorized personnel only may remove the cover.

Removing the Main Cover

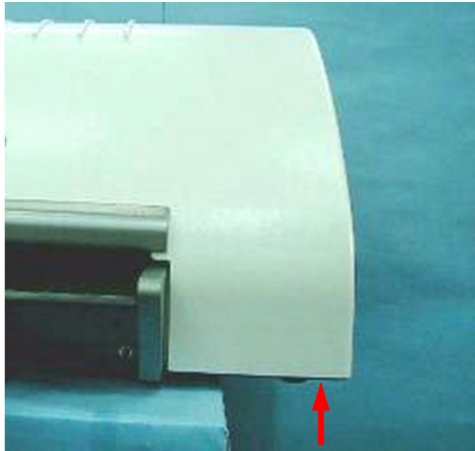
- [1] Switch off the Unit.
- [2] Remove the power cord from the Main Socket.
- [3] Detach the Power Cord from the back of the Unit.
- [4] Detach the USB cable.

Service Panel Screws

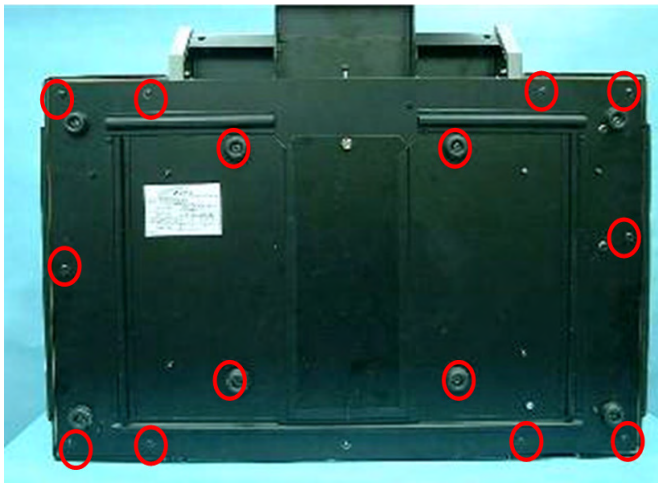


- [5] Remove the screws securing the service panel on the rear of the unit, and remove the service panel.

Access to Cover Screws



Cover Screws



Caution

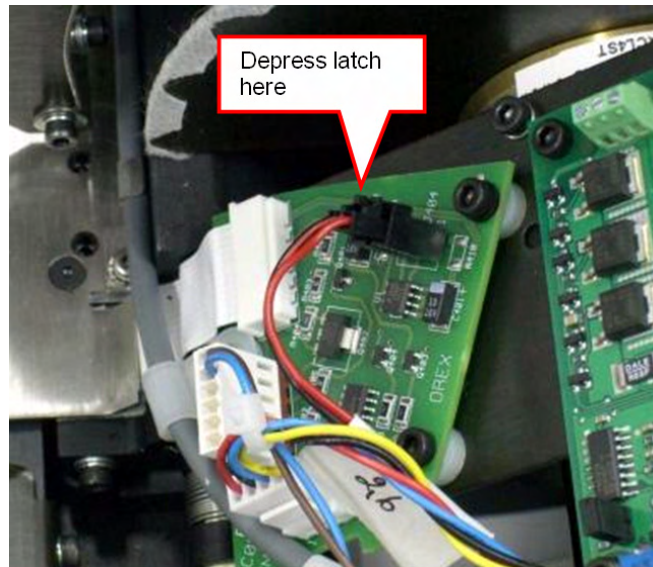
To remove screws from the bottom of the unit, do not turn it on its back. Move the unit to the edge of the worktable to gain access from below

- [6]** Remove the 11 screws securing the cover as in the above figure, and lift the cover off.
- [7]** Reverse the above steps to reinstall the cover.

Disconnecting the Laser

[1] Remove the Main Cover, see [“Removing the Main Cover” on Page 33](#).

Laser Connector on the Laser Board



[2] Disconnect the Laser Connector from the Laser Board. Depress the latch of the connector firmly to release it.

[3] Reconnect the Laser only after all repairs are complete.

[4] Close the Main Cover.

Replacing the USB Board

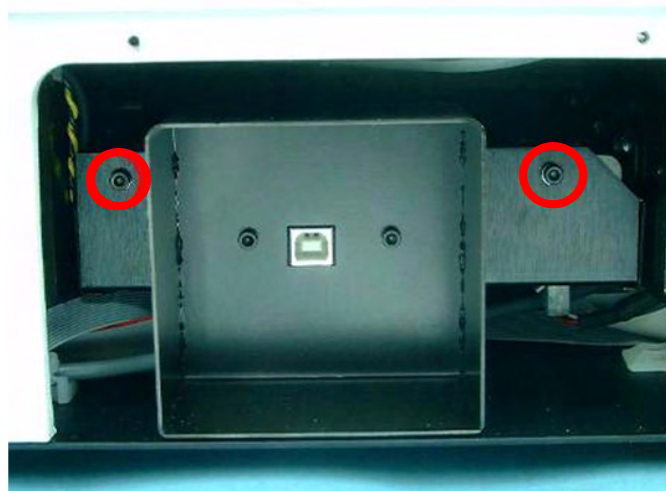


Laser Warning

To avoid possible eye damage, before operating the unit without the cover, disconnect the laser (see [“Disconnecting the Laser” on Page 35](#)). For additional laser precautions see [“Laser Safety Instructions” on Page 11](#). Only authorized personnel may remove the cover.

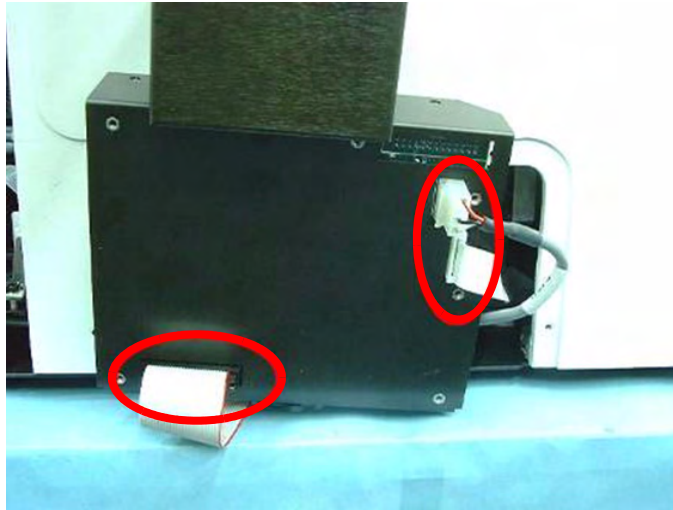
[1] Remove the service panel (see [“Removing the Main Cover” on Page 33](#)).

USB Cover



[2] Remove the 2 USB cover screws.

USB Board Connectors



[3] Pull the USB Board out and remove the cables from the bottom of the board.

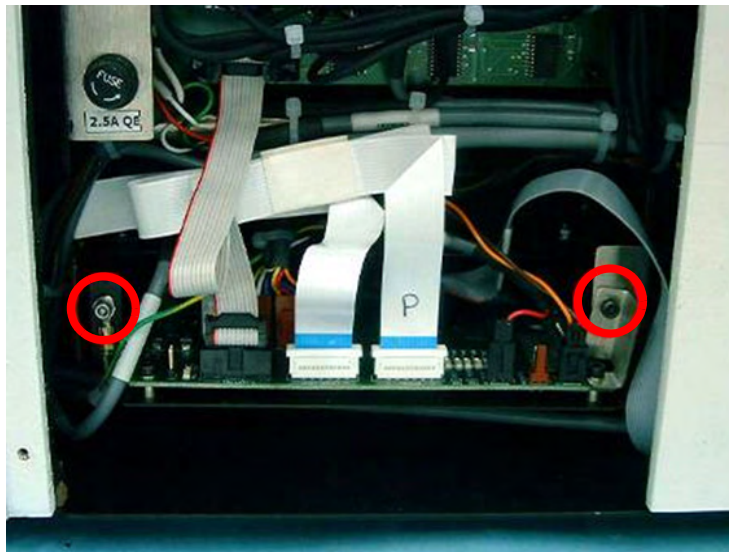
[4] Reverse the above steps to install the USB Board.

Replacing the Motion Board

**Laser Warning**

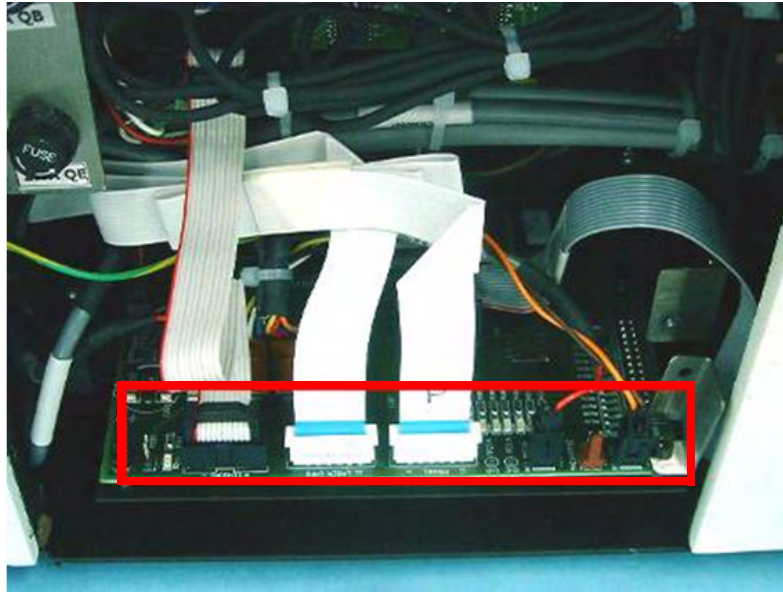
To avoid possible eye damage, before operating the unit without the cover, disconnect the laser (see [“Disconnecting the Laser” on Page 35](#)). For additional laser precautions see [“Laser Safety Instructions” on Page 11](#). Only authorized personnel may remove the cover.

[1] Remove the service panel (see [“Removing the Main Cover” on Page 33](#)).

Motion Board Bracket Screws

[2] Remove the 2 *Allen* screws securing the motion board bracket.

Motion Board Connectors



[3] Pull the Motion Board out and disconnect the cables.

[4] Reverse the above steps to install the Motion Board.

Replacing the Sensor Board

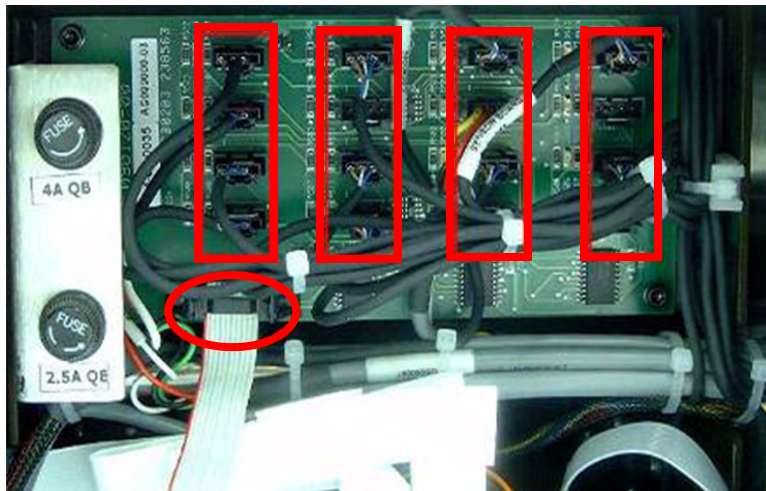


Laser Warning

To avoid possible eye damage, before operating the unit without the cover, disconnect the laser (see [“Disconnecting the Laser” on Page 35](#)). For additional laser precautions see [“Laser Safety Instructions” on Page 11](#). Only authorized personnel may remove the cover.

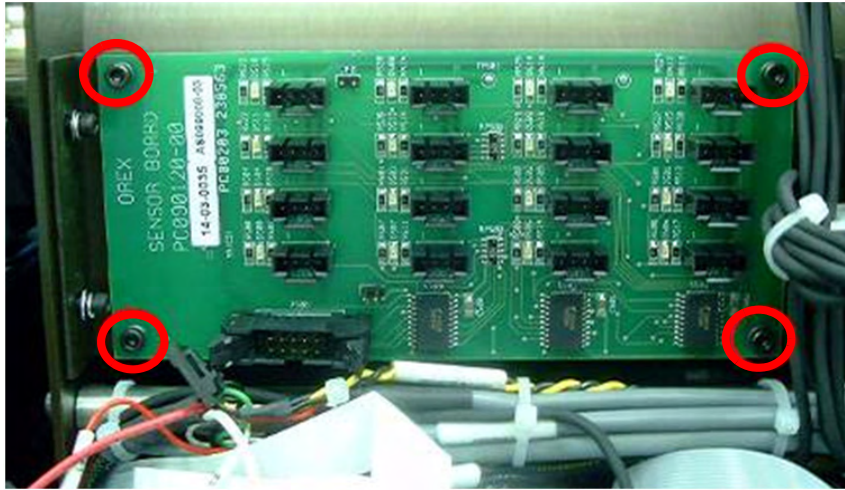
[1] Remove the service panel (see [“Removing the Main Cover” on Page 33](#)).

Sensor Board Connections



[2] Remove the electrical connectors from the Sensor Board.

Sensor Board Screws



[3] Remove the 4 screws securing the Sensor Board.

[4] Reverse the above steps to install the Sensor Board.

Each connector is marked with a number to indicate its location.

Replacing the PM Tube and PM Board

**Laser Warning**

To avoid possible eye damage, before operating the unit without the cover, disconnect the laser (see [“Disconnecting the Laser” on Page 35](#)). For additional laser precautions see [“Laser Safety Instructions” on Page 11](#). Only authorized personnel may remove the cover.

[1] Open the User Interface.

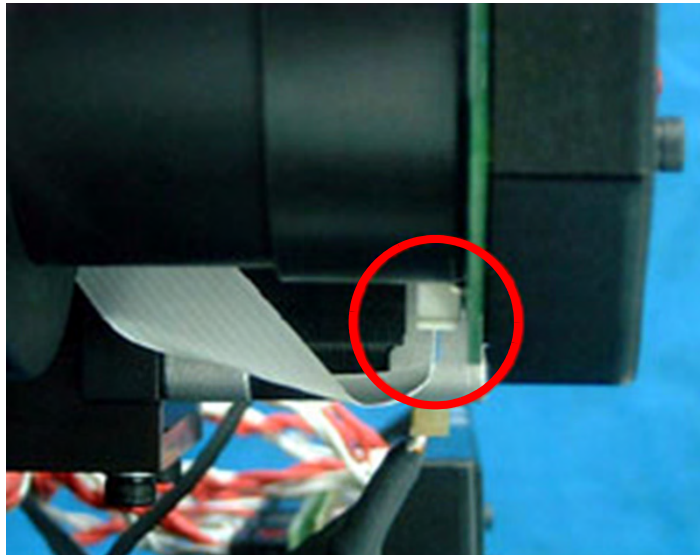
[2] Open the “Diagnostic” tab and move the optical head to the left position.

[3] Remove the Main Cover (see [“Removing the Main Cover” on Page 33](#)).

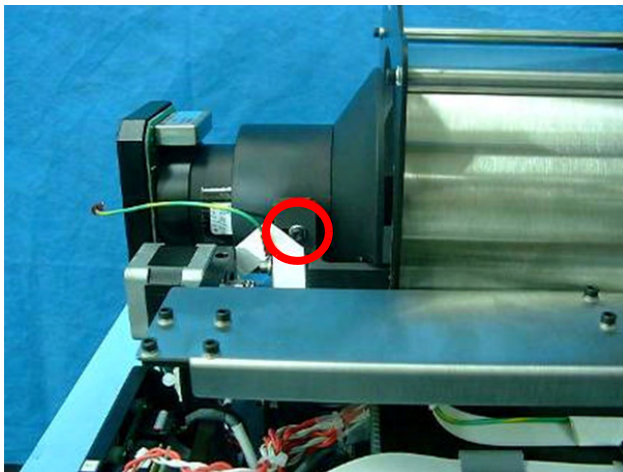
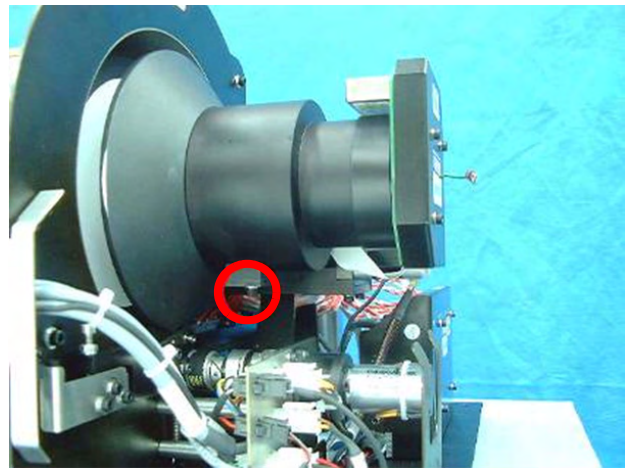
PM Ground Wire



[4] Remove the screw attaching the ground wire.

Connector to the PM Board

[5] Disconnect the flex cable from its connector at the bottom of the PM Board.

PM Assembly Screw (one side shown)**PM Assembly Lower Screw**

[6] Remove the screws securing the PM Assembly.

[7] Reverse the above steps to install the PM Assembly. The short screw is at the bottom.

Replacing the Laser Board

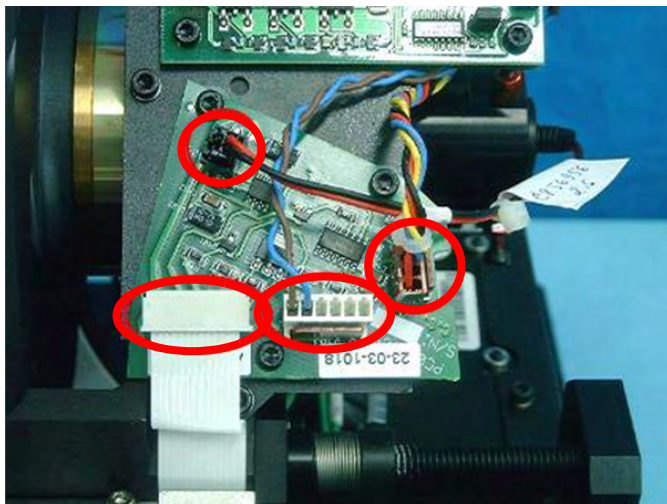


Laser Warning

To avoid possible eye damage, before operating the unit without the cover, disconnect the laser (see [“Disconnecting the Laser” on Page 35](#)). For additional laser precautions see [“Laser Safety Instructions” on Page 11](#). Only authorized personnel may remove the cover.

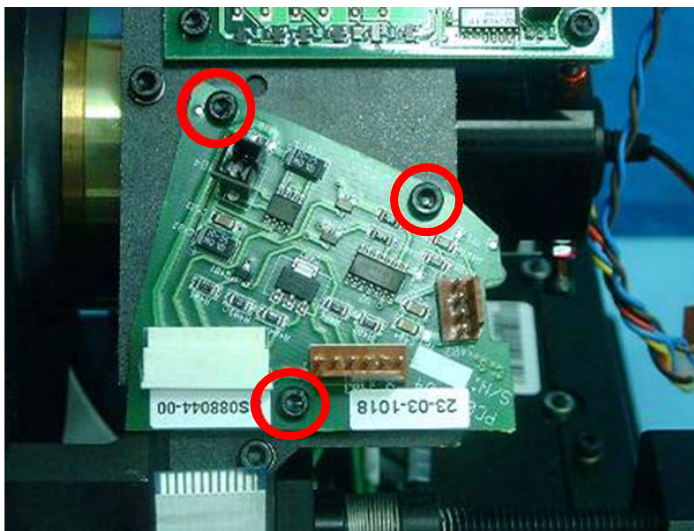
- [1] Remove the Main Cover (see [“Removing the Main Cover” on Page 33](#)).

Laser Board Connectors



- [2] Disconnect the cables from the Laser Board.

Laser Board Screws



- [3] Remove the 3 screws securing the Laser Board, and remove the board.
[4] Reverse the above steps to install the Laser Board.

Replacing the Roller Motor

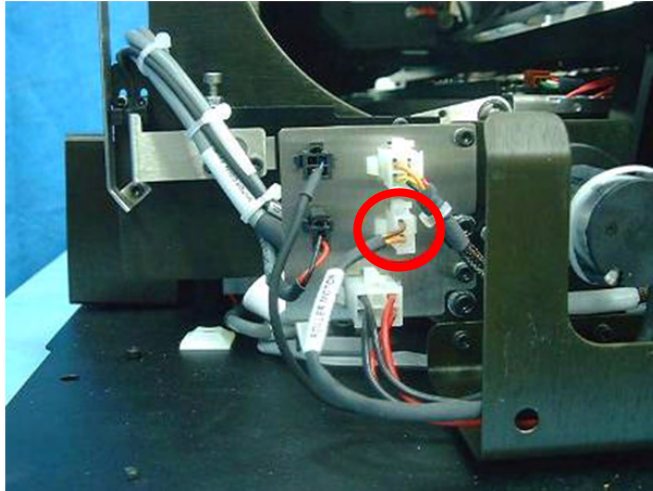


Laser Warning

To avoid possible eye damage, before operating the unit without the cover, disconnect the laser (see [“Disconnecting the Laser” on Page 35](#)). For additional laser precautions see [“Laser Safety Instructions” on Page 11](#). Only authorized personnel may remove the cover.

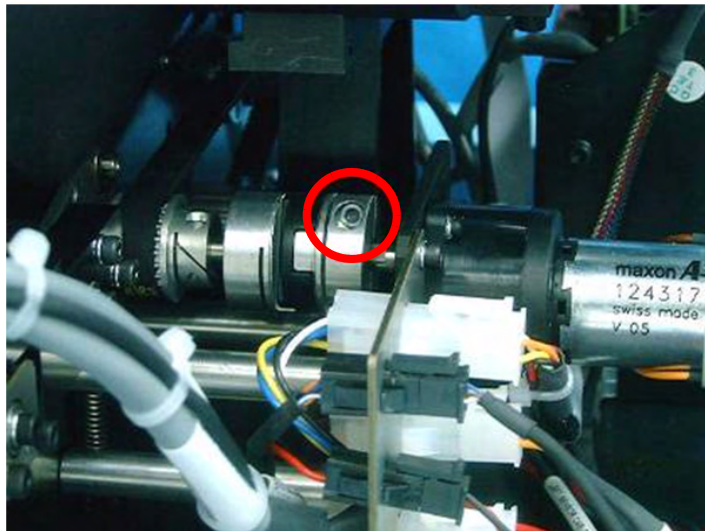
[1] Remove the Main Cover (see [“Removing the Main Cover” on Page 33](#)).

Roller Motor Connector



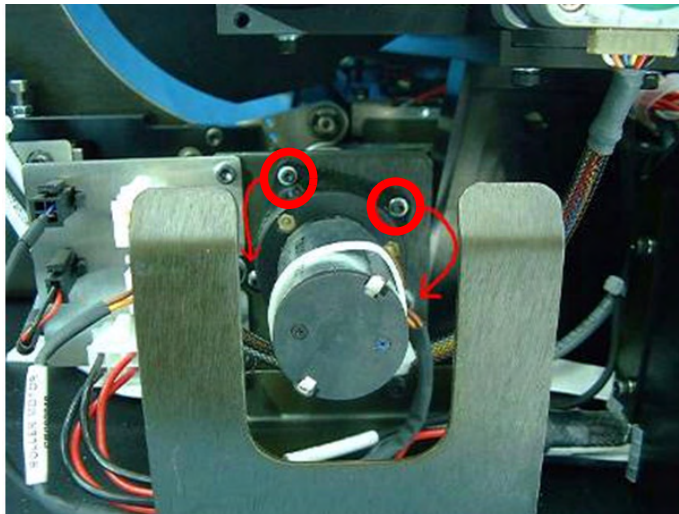
[2] Disconnect the Roller Motor Cable from the connector panel.

Roller Coupling Screw



[3] Remove the roller coupling screw.

Roller Motor Screws



- [4] Remove the 4 screws securing the roller motor.
- [5] Hold the coupling in place and pull out the motor.
- [6] Reverse the above steps to install the motor.

Replacing the Loader Stepper Motor

Introduction

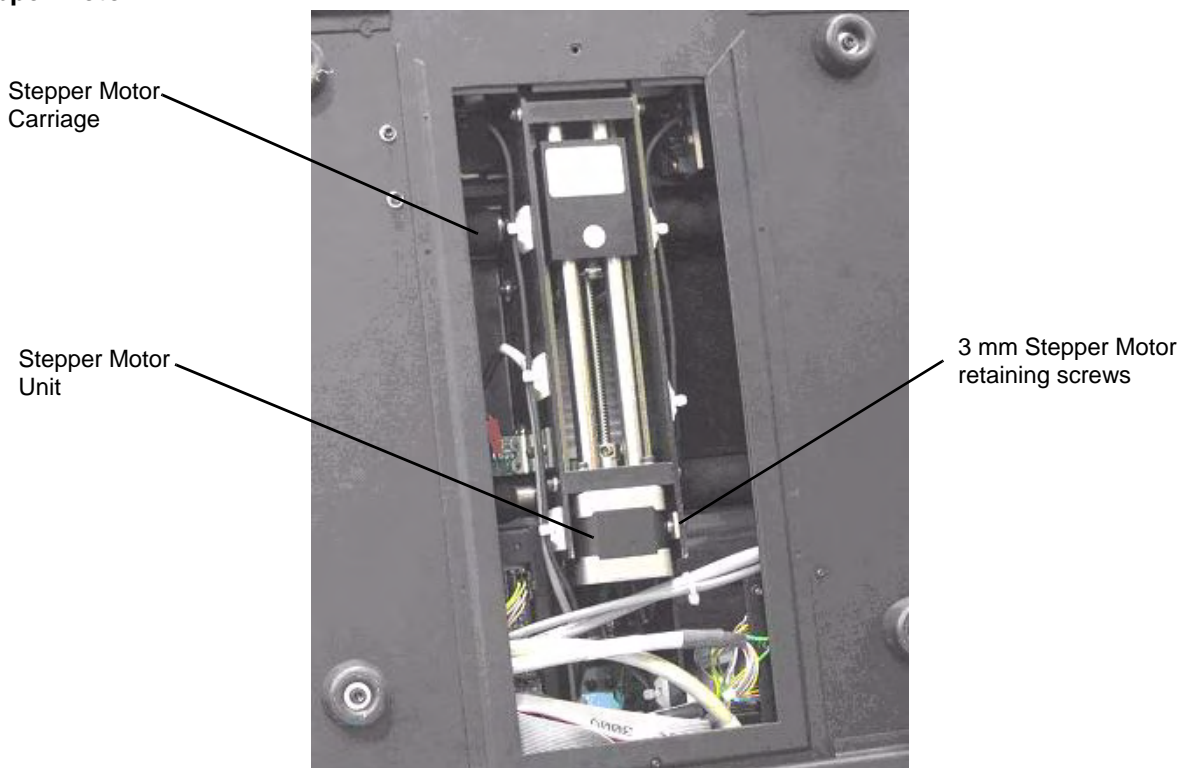


Laser Warning

When a service operation is taking place with the cover removed, disconnect the Laser according to the procedure in [“Disconnecting the Laser” on Page 35](#). If the Laser must be activated during the service procedure, wear protective safety glasses at all times.

The Loader Stepper Motor Assembly unloads the plate from the Cassette for insertion into the Drum.

Stepper Motor



Tools Required

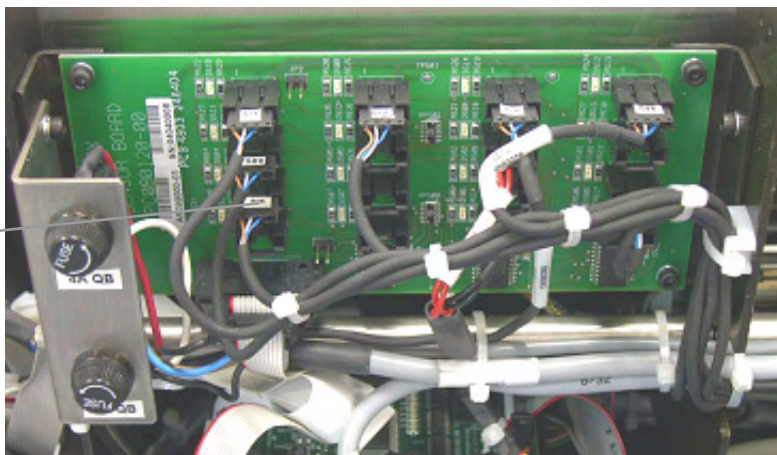
- Replacement Stepper Motor
- 3.0 mm Allen wrench
- 2.5 mm x 100 mm cable ties
- Cutter
- Tray Gauge (T00900251)
- Feeler Gauge 0.5 mm
- Feeler Gauge 0.8 mm

Removing the Stepper Motor

- [1] Disconnect the Scanner from the main power.
- [2] Remove the Service Panel and Scanner Cover. (See [“Removing the Main Cover” on Page 33](#) .)

Sensor Board

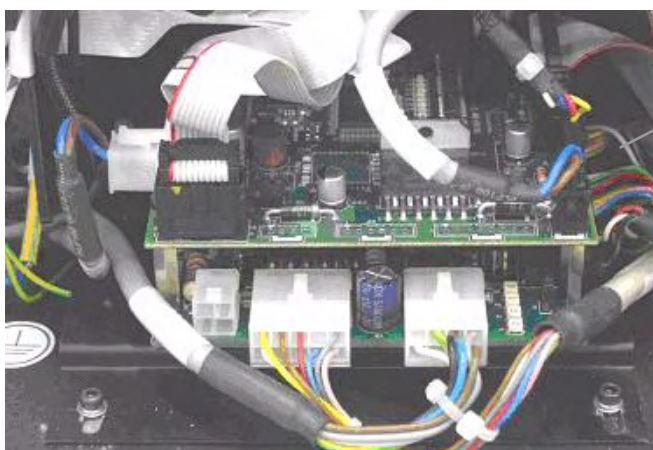
J505 Stepper Motor
Sensor Connector



- [3] Disconnect the J505 Stepper Motor Sensor Connector from the Sensor Board and cut the cable ties to free the cable to the Stepper Motor.

Motion Board

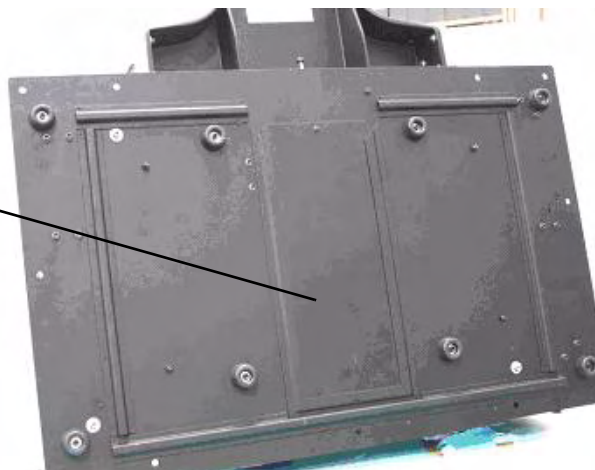
J4



- [4] Disconnect the Stepper Motor connector from Motion Board Connector J4 and cut the cable ties to free the cable to the Stepper Motor. (See Figure [“Sensor Board” on Page 44.](#))

Scanner Tipped On Its Back

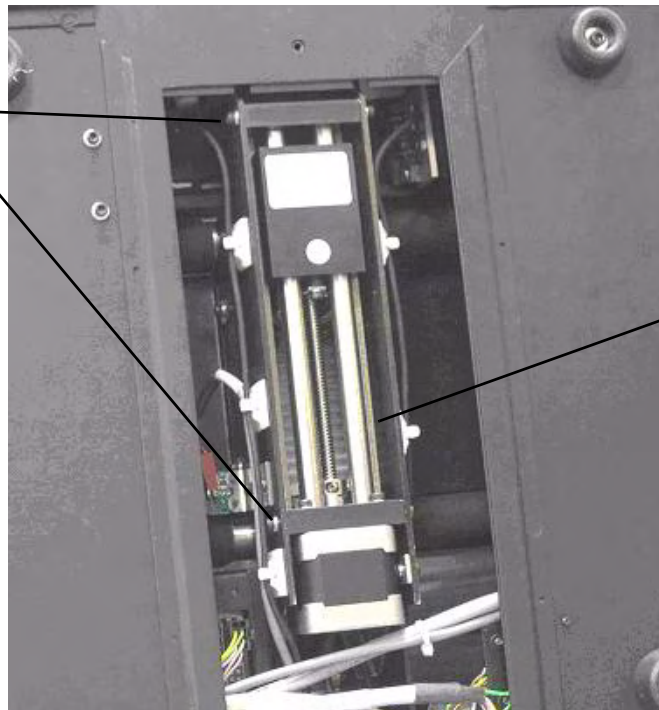
Bottom Service
Access Panel



- [5] Turn the Scanner on its back, and slide out the Bottom Service Access Panel. (See Figure [“Scanner Tipped On Its Back” on Page 44.](#))
- [6] Pull the Carriage down towards the Motor.

Stepper Motor Unit

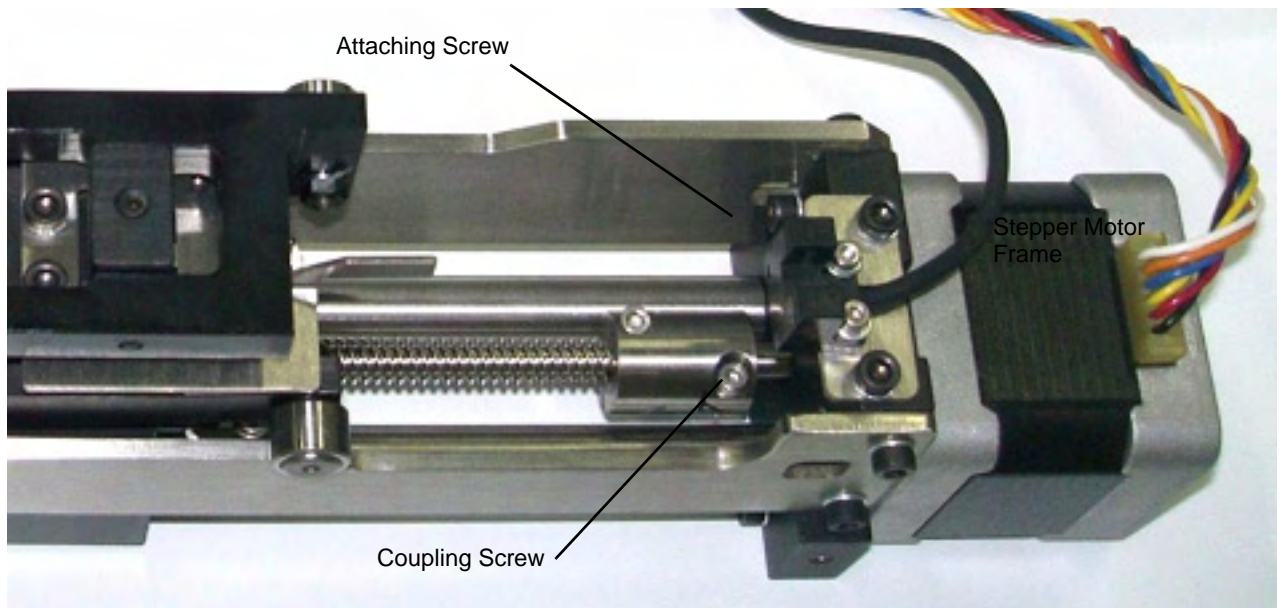
3 mm Motor
retaining screws



Stepper Motor
Frame

- [7] Remove the four 3.0 mm Allen Screws from the frame of the Stepper Motor, and pull out the unit. (See Figure [“Stepper Motor Unit” on Page 45.](#))

Loader Assembly with Stepper Motor



- [8] Loosen the coupling screw closest to the motor.
[9] Remove the four screws that attach the motor to the loader assembly.
[10] Carefully remove the motor from the assembly.

Replacing the Stepper Motor

- [1] Replace:
- Stepper Motor unit into the Motor Frame

- Four 3.0 mm screws
- Sensor Cable
- Motion Board Cable

[2] Close the Access Panel and return the Scanner on to its base.

[3] Reconnect the Sensor Cable to the Sensor Board and the Motion Cable to the Motion Board and fasten the cable ties.

[4] Perform the test procedures in the section below before replacing the Scanner Cover.

[5] Replace:

- Scanner Cover
- Service Panel

Test Procedures



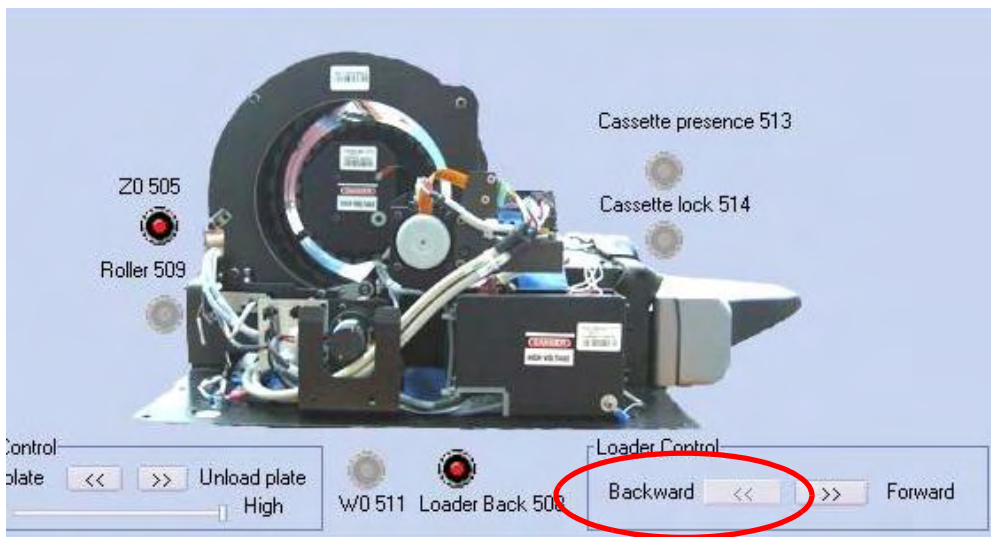
Laser Warning

When a service operation is taking place with the cover removed, disconnect the Laser according to the procedure in [“Disconnecting the Laser” on Page 35](#). If the Laser must be activated during the service procedure, wear protective safety glasses at all times.

[1] Confirm the Loader Pin height is correct:

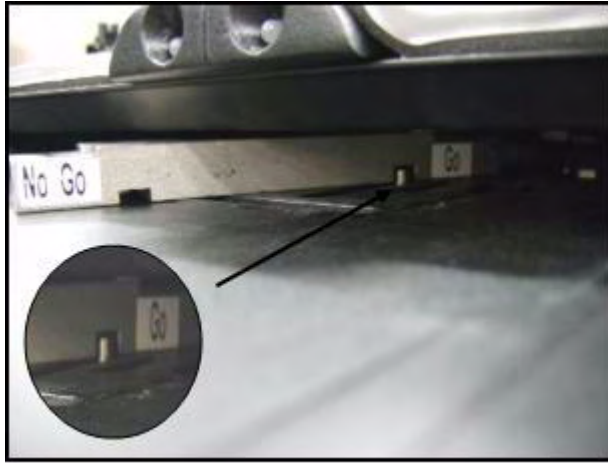
- Turn on the Scanner.
- Log in into Technician mode.
- Choose “Setup” and enter the “Diagnostics” tab.

Diagnostics Screen Loader Control



(d) Click on the [<<] sign to move the loader back to the end of its travel and the “loader back” indicator lights.

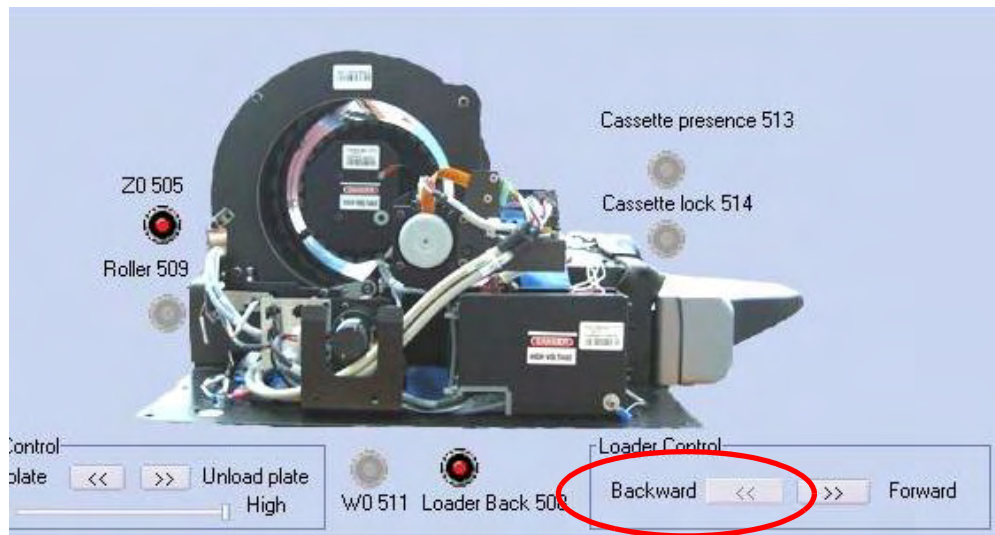
Checking Pin Height



- (e) Insert the Tray Gauge into the tray entrance and position the Go slot around the loader pin. The gauge should pass smoothly over the loader pin. This determines that the pin is not too high.
- (f) Insert the Tray Gauge into the tray entrance and position the No Go slot next to loader pin. The should not pass over the loader pin. This determines that the pin is not too low.
- (g) If the pin height is incorrect, remove the bottom access cover, loosen the motor frame retaining screws and adjust the frame position as necessary.

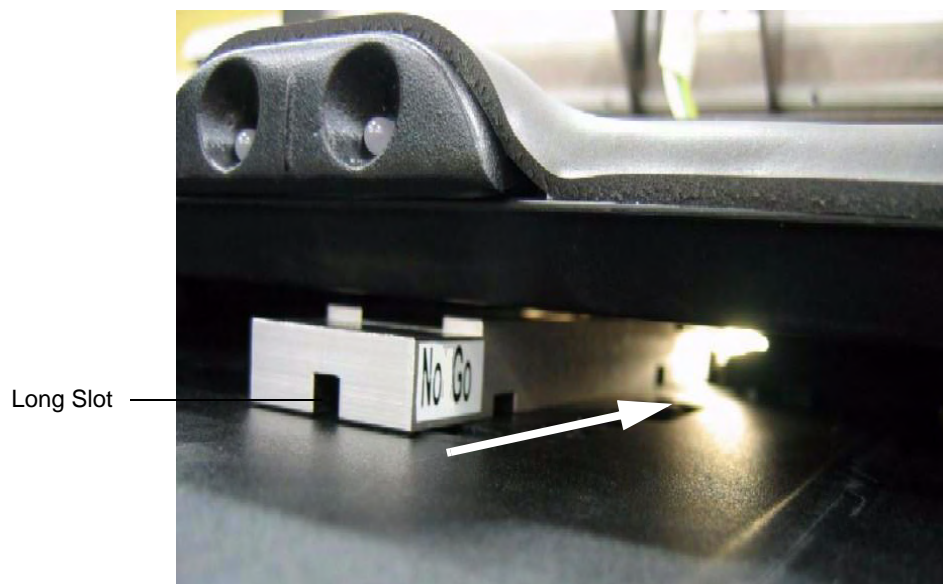
[2] Confirm the Loader Pusher position is correct:

Diagnostics Screen Loader Control



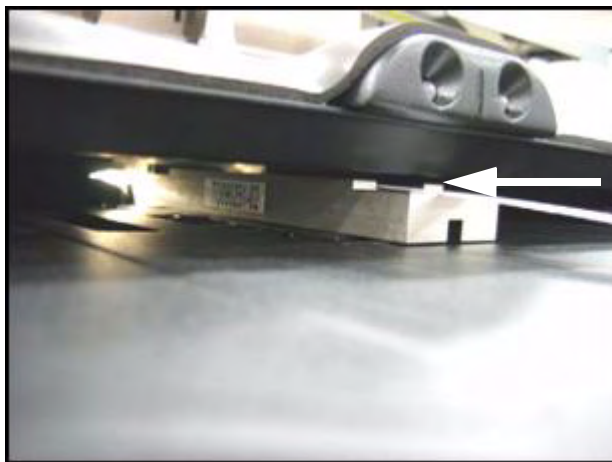
- (a) Click on the [<<] sign to move the loader back to the end of its travel and the "loader back" indicator lights.

Inserting the Tray Gauge



- (b)** Insert the Tray Gauge into the tray entrance so the long slot on the bottom passes over the loader pin.

Inserting the Feeler Gauge



- (c)** Insert the 0.5 Feeler Gauge over the top of the Tray Gauge so it passes under the lip of the pusher. It should enter smoothly.
- (d)** Remove the 0.5 Feeler Gauge.
- (e)** Insert the 0.8 Feeler Gauge. It should not pass the lip of the pusher.
- (f)** If the pusher height is incorrect, remove the bottom access cover, loosen the motor frame retaining screws and adjust the frame position as necessary.

Replacing the Slide

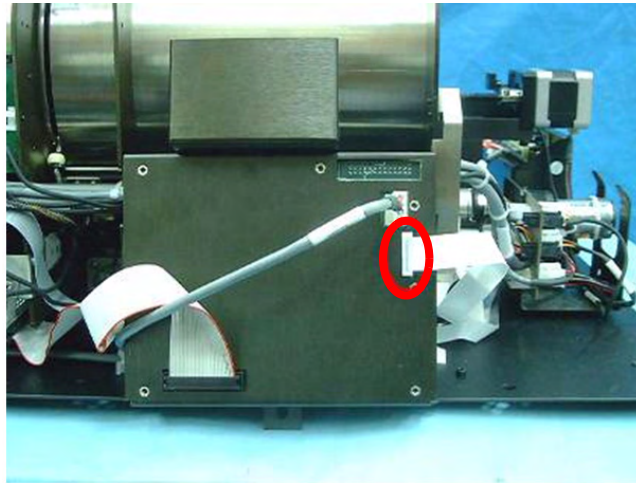


Laser Warning

To avoid possible eye damage, before operating the unit without the cover, disconnect the laser (see [“Disconnecting the Laser” on Page 35](#)). For additional laser precautions see [“Laser Safety Instructions” on Page 11](#). Only authorized personnel may remove the cover.

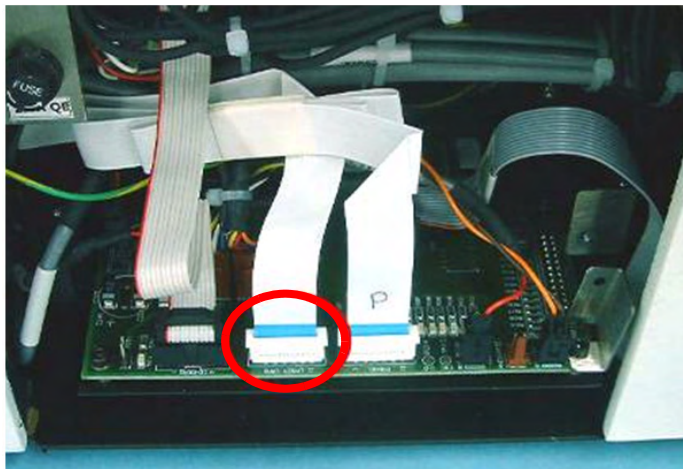
- [1] Using the user interface Diagnostic screen, move the Optical Head to the middle of the drum.
- [2] Remove the main cover (see [“Removing the Main Cover” on Page 33](#)).

Connector to USB Board



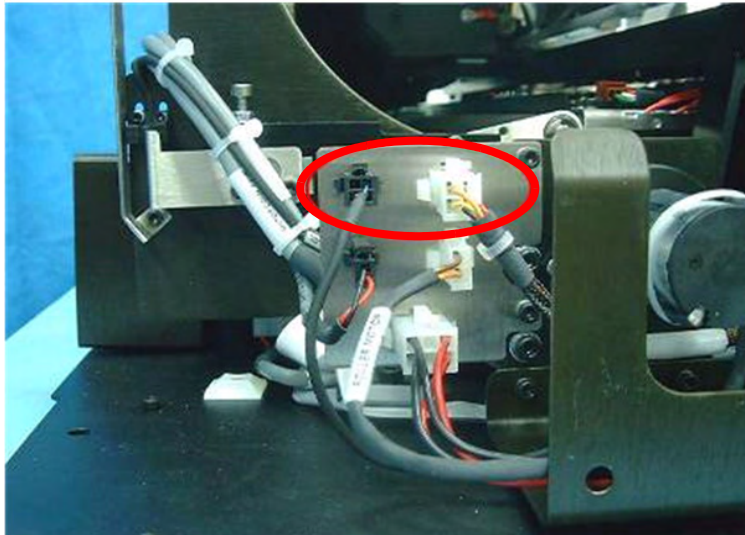
- [3] Disconnect the flex cable from the USB Board.

Laser Board Cable and Connectors



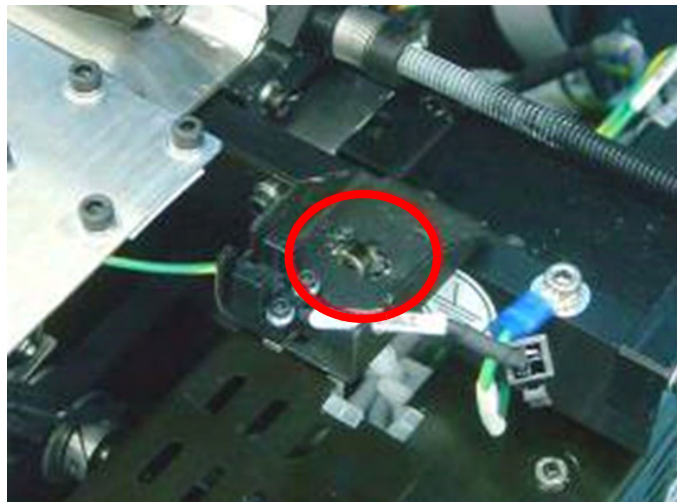
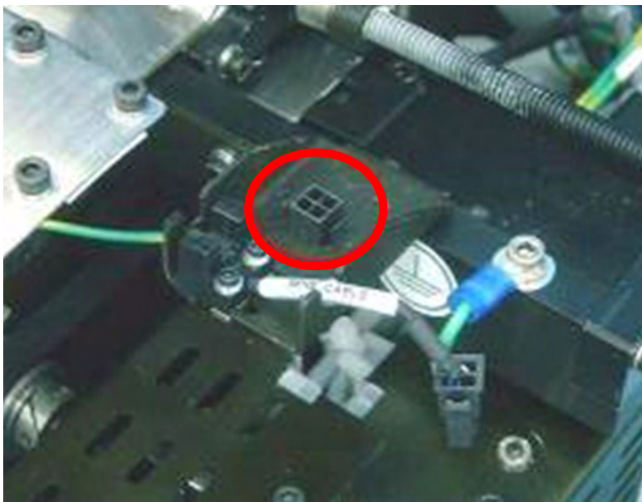
- [4] Disconnect the Laser Board flex cable from the Motion Board.
- [5] Release the 2 flex cables, until they can be taken out freely along with the slide.

Stepper Motor and Left Limit Sensor Connectors



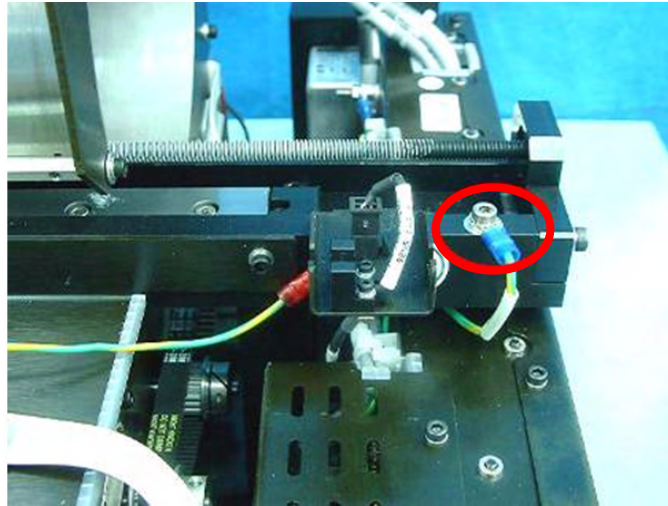
[6] Disconnect the Slide Stepper Motor Cable and the Left Limit Sensor Cable from the Connector Panel.

Right Limit Sensor Connector



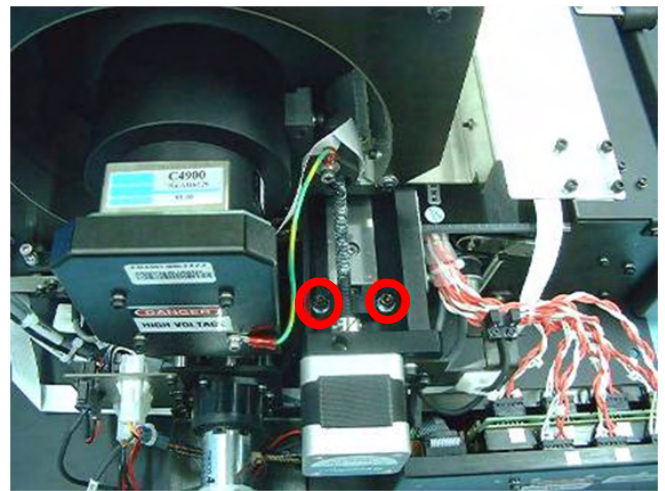
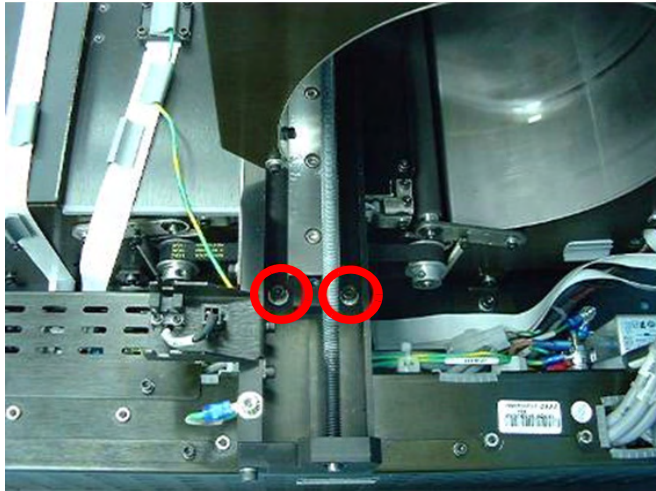
[7] Disconnect the Right Limit Sensor Cable from its connector and remove the connector from its bracket

Screw Attaching the Ground Wire



- [8] Disconnect the ground wire from the slide, by removing the screw; then, removing the ground wire.

Slide Assembly Attaching Screws



- [9] Remove the 4 screws holding the Slide Assembly to the system (2 on each side).
- [10] Remove the Slide Assembly from the system by pulling it to the left, until it is out of the drum. While pulling it out, pay attention to the location of the flex cables.
- [11] Reverse the above steps to install the slide assembly.

Replacing the Carriage Stepper Motor

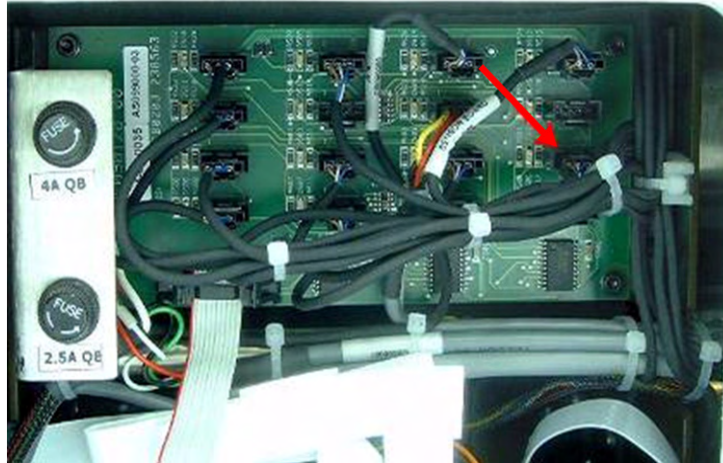


Laser Warning

To avoid possible eye damage, before operating the unit without the cover, disconnect the laser (see [“Disconnecting the Laser” on Page 35](#)). For additional laser precautions see [“Laser Safety Instructions” on Page 11](#). Only authorized personnel may remove the cover.

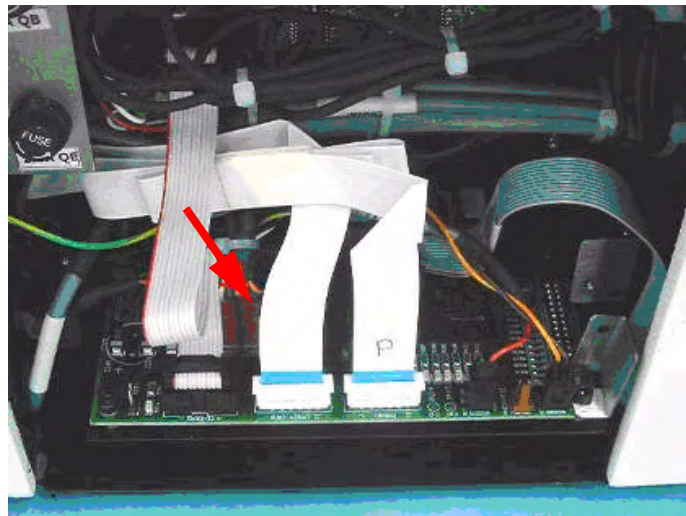
- [1] Using the user interface “Diagnostic” screen, move the Optical Head to the middle of the drum.
- [2] Remove the Main Cover (see [“Removing the Main Cover” on Page 33](#)).

Connector J505 on the Connector Board



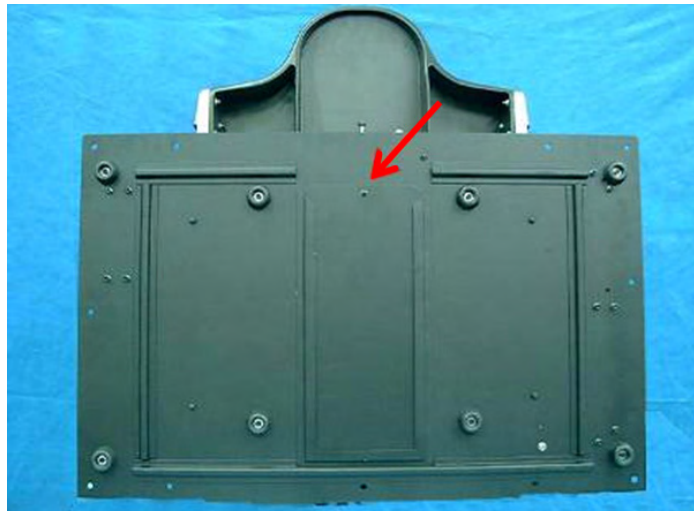
[3] Disconnect connector J505 on the Sensors Board; making sure that the wire is free.

Stepper Motor Cable

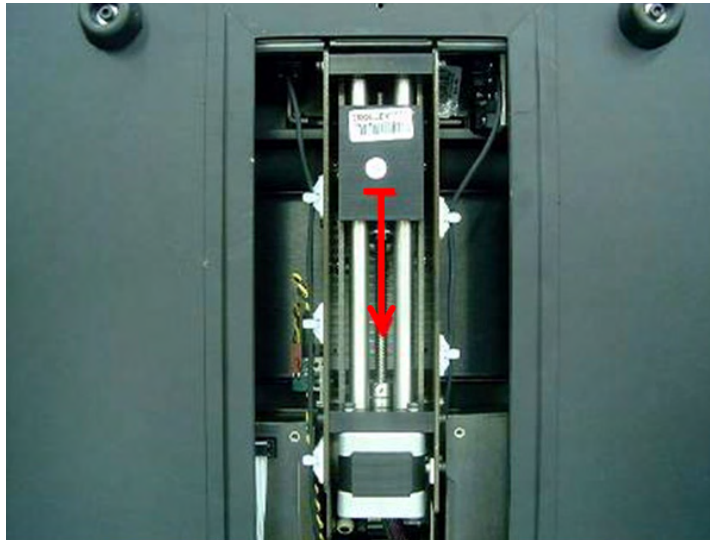


[4] Disconnect the Stepper Motor Cable from the Motion Board J204 (Loader) connector.

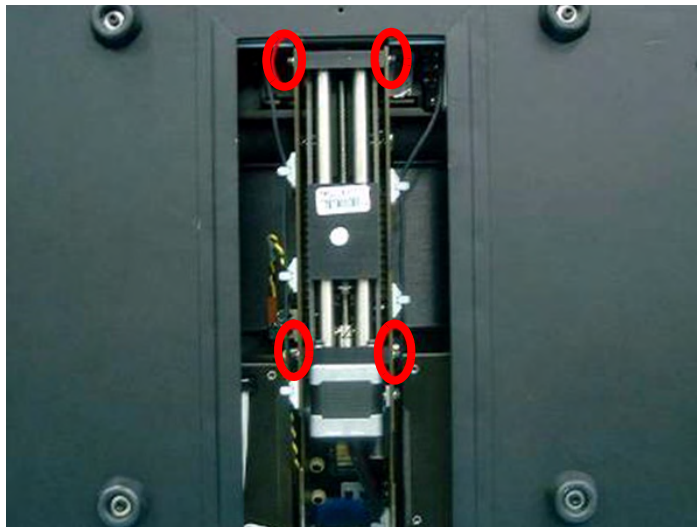
Bottom of Unit



[5] Place the unit on its back, and open the door on the bottom.

Pulling the Carriage Down

[6] Pull the Carriage down.

Carriage Assembly Attaching Screws

[7] Remove the 4 screws attaching the Carriage Assembly to the system, and pull the Carriage Assembly out.

[8] Reverse the above steps to install the Carriage Assembly.

Replacing the Power Supply

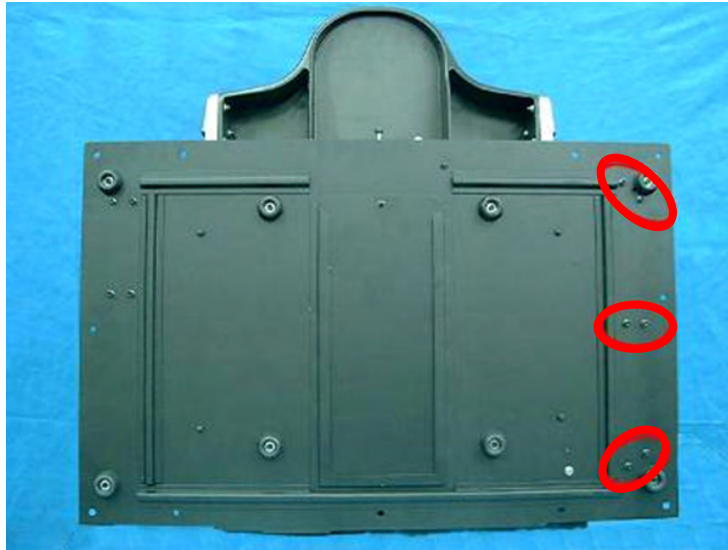


Laser Warning

To avoid possible eye damage, before operating the unit without the cover, disconnect the laser (see [“Disconnecting the Laser” on Page 35](#)). For additional laser precautions see [“Laser Safety Instructions” on Page 11](#). Only authorized personnel may remove the cover.

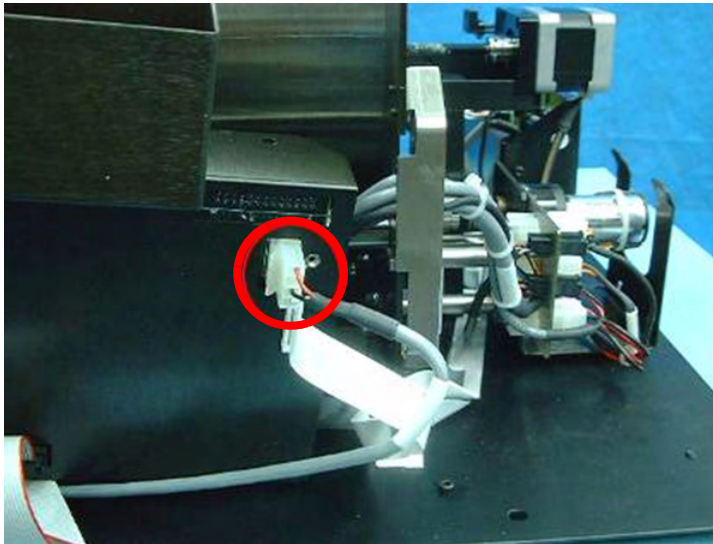
[1] Remove the Main Cover (see [“Removing the Main Cover” on Page 33](#)).

Power Supply Screws

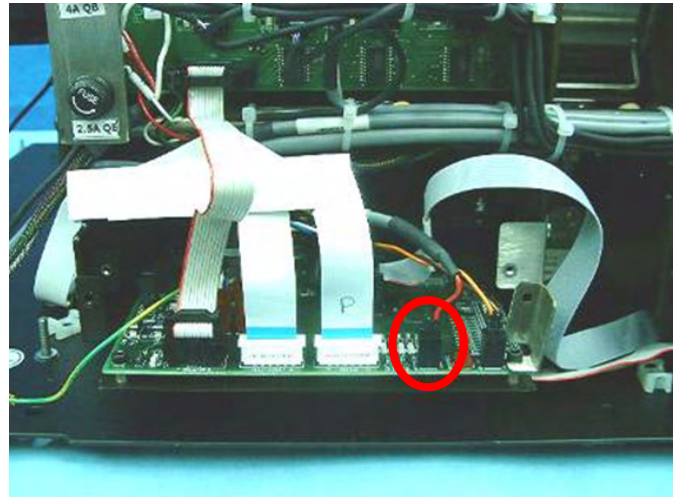
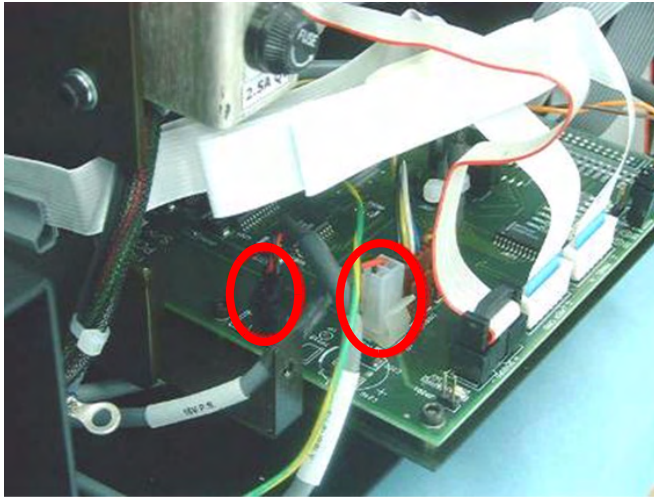


[2] Pull the system to the edge of the table, and open the six screws that attach the Power Supply assembly to the base of the unit.

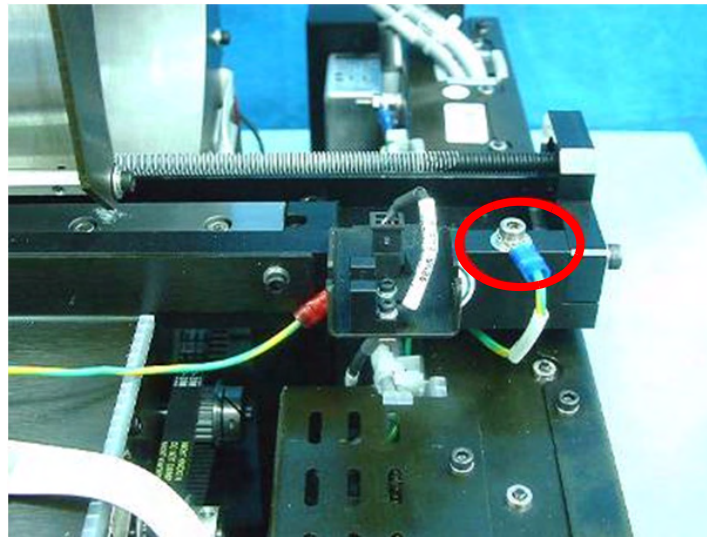
Cable Connection to USB Board



[3] Disconnect the power cable from the USB Board.

Connectors on the Motion Board

[4] Disconnect connectors J213, J211 and U211 from the Motion Board.

Ground Wire Screw

[5] Remove the 3.5 mm screw which attaches the ground wire to the slide.

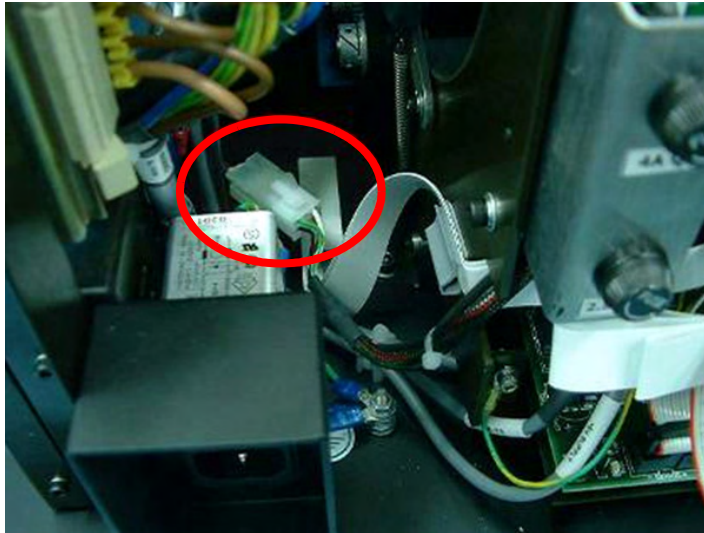
Main Ground Stud



[6] Remove from the stud:

- 7 mm nut
- main ground wires

Fuse Connector



[7] Disconnect the fuse connector.

[8] Remove the power supply assembly.

[9] Reverse the above steps to install the power supply assembly.

Replacing the Erase Lamp Inverters

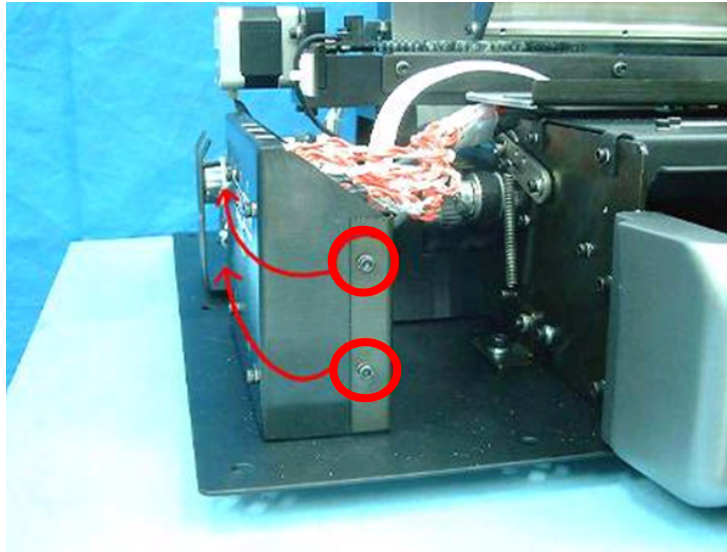


Laser Warning

To avoid possible eye damage, before operating the unit without the cover, disconnect the laser (see [“Disconnecting the Laser” on Page 35](#)). For additional laser precautions see [“Laser Safety Instructions” on Page 11](#). Only authorized personnel may remove the cover.

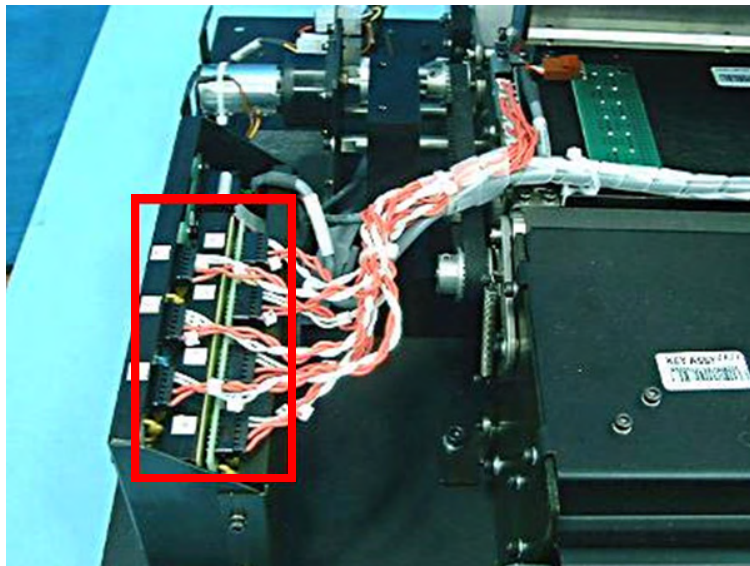
[1] Remove the Main Cover (see [“Removing the Main Cover” on Page 33](#)).

Inverter Cover Screws



[2] Remove the 4 screws securing the Inverter Cover.

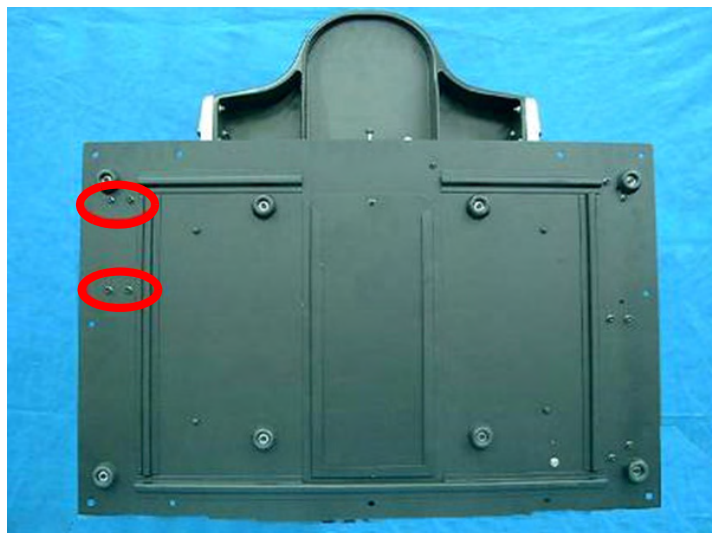
Erase Lamp Connectors



[3] Disconnect the Erase Lamps Connectors from the Inverters.

[4] Disconnect the cables from the Erase Lamp Board.

Inverter Attaching Screws



- [5] On the bottom of the unit, remove the screws that attach to the Inverter Assembly.
- [6] Remove the Inverter Assembly.
- [7] Reverse the above steps to install the Inverter Assembly.

Replacing the Erase Lamp Sensors

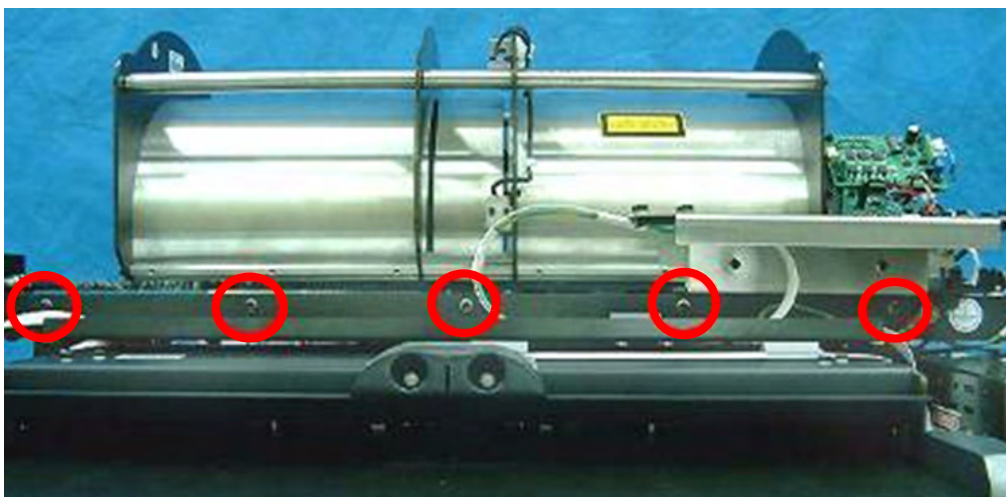


Laser Warning

To avoid possible eye damage, before operating the unit without the cover, disconnect the laser (see [“Disconnecting the Laser” on Page 35](#)). For additional laser precautions see [“Laser Safety Instructions” on Page 11](#). Only authorized personnel may remove the cover.

- [1] Remove the Main Cover (see [“Removing the Main Cover” on Page 33](#)).

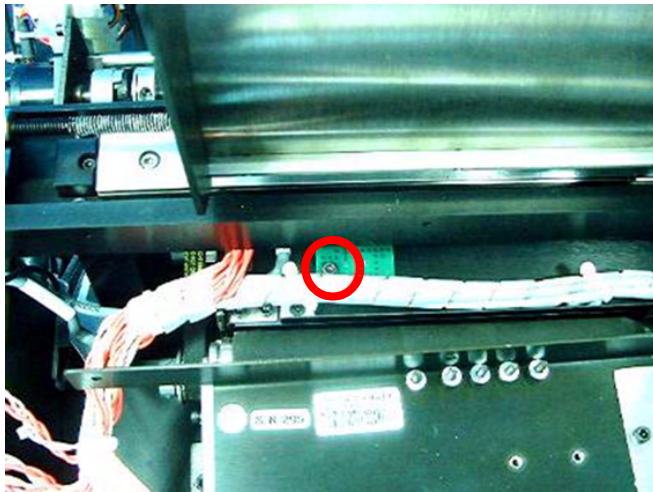
Flex Cable Bracket



- [2] Open the 5 screws that attach the Flex Cable Bracket to the system.

Erase Lamp Sensor

[3] Disconnect the cable from the Erase Lamp Sensor.

Erase Lamp Sensor Screws

[4] Remove the 2 screws securing the sensor, and remove the sensor.

[5] Reverse the above steps to install the Erase Lamp Sensor.

Replacing the Left Limit Sensor

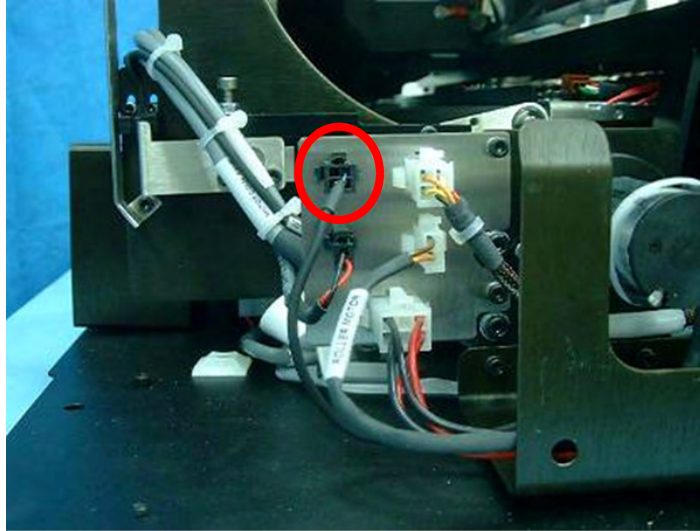


Laser Warning

To avoid possible eye damage, before operating the unit without the cover, disconnect the laser (see [“Disconnecting the Laser” on Page 35](#)). For additional laser precautions see [“Laser Safety Instructions” on Page 11](#). Only authorized personnel may remove the cover.

- [1] Remove the Main Cover (see [“Removing the Main Cover” on Page 33](#)).

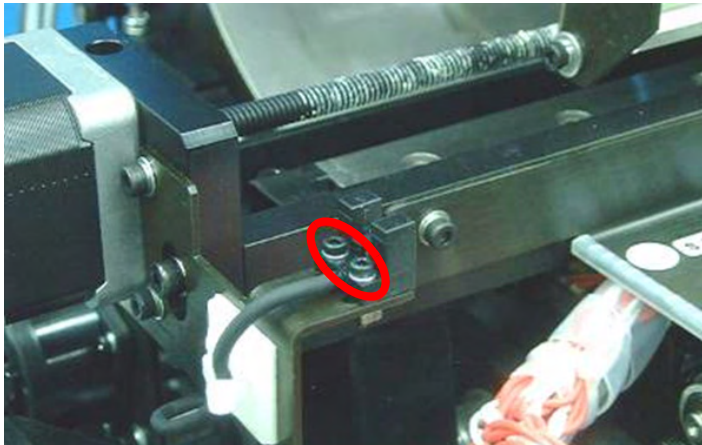
Left Limit Sensor Connector



- [2] Disconnect the Sensor Cable from the Connector Panel.

- [3] Mark the location of the sensor.

Left Limit Sensor Screws



- [4] Remove the 2 screws attaching the sensor to the sensor bracket, and remove the sensor.

- [5] Reverse the above steps, to install the Left Limit Sensor, using the marked location of the previous sensor.

Replacing the Right Limit Sensor

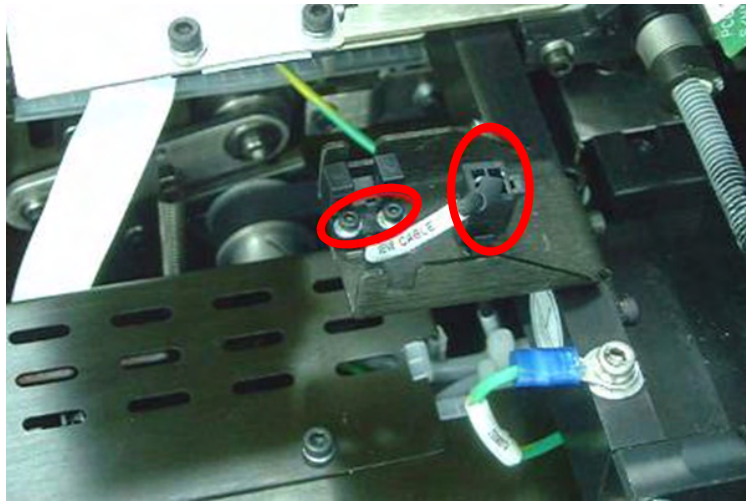


Laser Warning

To avoid possible eye damage, before operating the unit without the cover, disconnect the laser (see [“Disconnecting the Laser” on Page 35](#)). For additional laser precautions see [“Laser Safety Instructions” on Page 11](#). Only authorized personnel may remove the cover.

- [1] Remove the Main Cover (see [“Removing the Main Cover” on Page 33](#)).
- [2] Move the Optical Head a few centimeters to the left.

Right Limit Sensor



- [3] Mark the position of the sensor on the sensor bracket.
- [4] Disconnect the cable from the connector on the sensor bracket, open two 2.0 mm *Allen* screws, and remove the sensor.
- [5] Reverse the above steps, to install the Right Limit Sensor, using the marked location of the previous sensor.

Replacing the Plate Size Sensor



Laser Warning

To avoid possible eye damage, before operating the unit without the cover, disconnect the laser (see [“Disconnecting the Laser” on Page 35](#)). For additional laser precautions see [“Laser Safety Instructions” on Page 11](#). Only authorized personnel may remove the cover.

[1] Remove the main cover (see [“Removing the Main Cover” on Page 33](#)).

Plate Size Sensor (1 of 4)



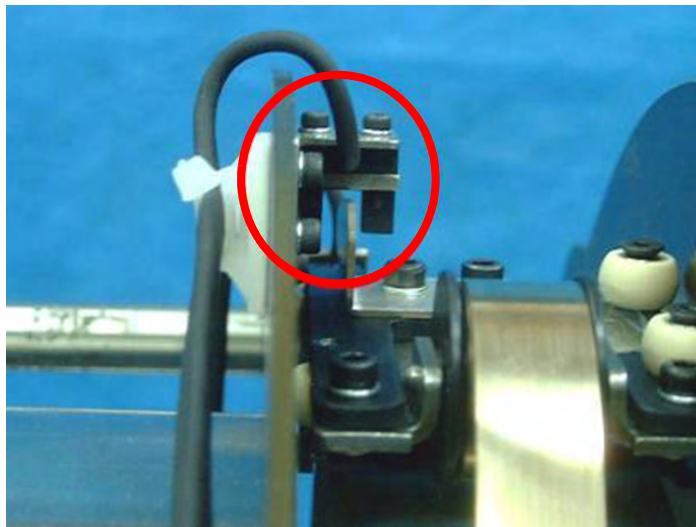
[2] Locate the Sensor and remove the 2 *Allen* screws.

[3] Cut the wire ties holding the sensor cable, and follow the cable up to the sensor board.

[4] Disconnect the cable from the sensor board.

[5] Reverse the above steps to install the plate size sensor, securing the cable with a new wire tie.

Plate Guide Passing Under Plate Size Sensor



[6] After installation, make sure that the plate guide passes under the sensor without interference.

Replacing the Roller Sensor



Laser Warning

To avoid possible eye damage, before operating the unit without the cover, disconnect the laser (see [“Disconnecting the Laser” on Page 35](#)). For additional laser precautions see [“Laser Safety Instructions” on Page 11](#). Only authorized personnel may remove the cover.

[1] Remove the main cover (see [“Removing the Main Cover” on Page 33](#)).

Roller Sensor



[2] Mark the position of the sensor.

[3] Remove the 2 screws securing the sensor, and remove the sensor.

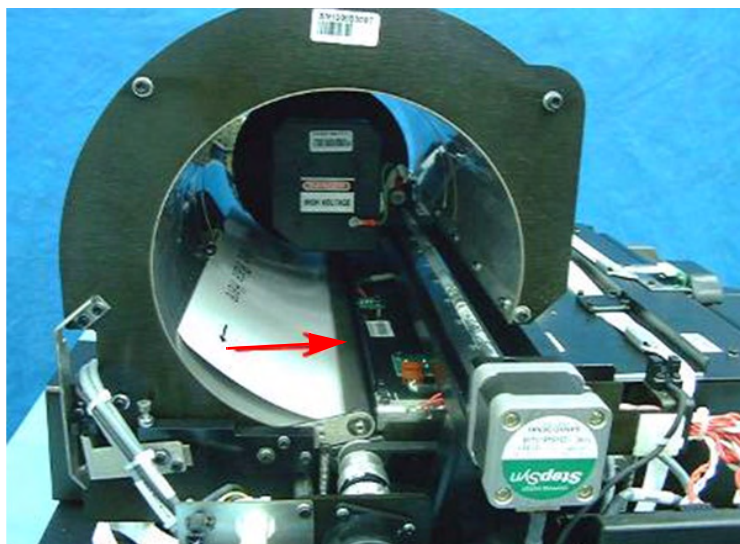
[4] Disconnect the sensor cable J509 from the sensor board.

[5] Reverse the above steps, to install the roller sensor, using the marked location of the previous sensor.

[6] Continue to the following steps to verify correct positioning of the sensor.

[7] Turn on the system and wait until the initialization process is complete.

Checking the Roller Sensor Using a Demo Plate



Caution

Make sure that the laser is disconnected.

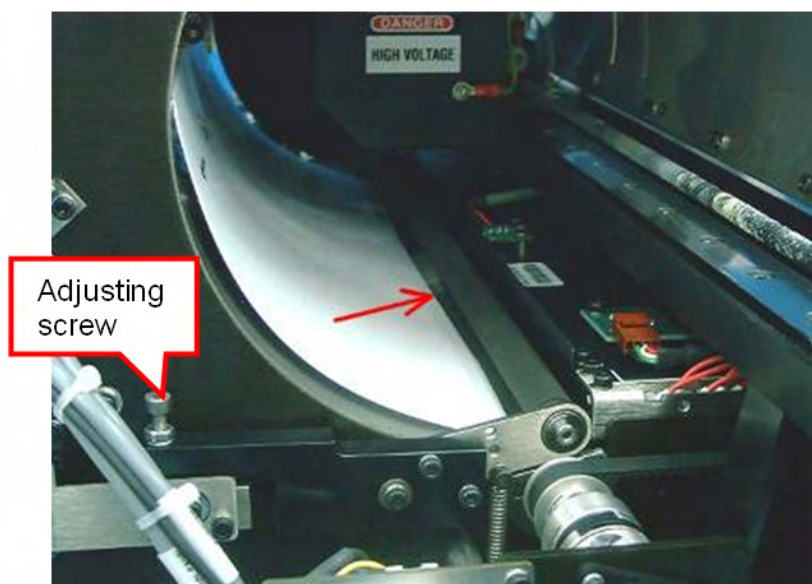
[8] Insert a demo plate between the rollers (it can be the plastic part of the cleaning plate).

Checking the Roller Sensor



[9] Verify that the Rollers Sensor is open. The red LED indicator in the sensor should be on.

Removing the Demo Plate



[10] Remove the demo plate from the rollers.

[11] Verify that the Rollers Sensor is closed. The red LED indicator in the sensor should be off.

[12] If the Roller Sensor does not indicate the presence of the demo plate correctly, adjust the position of the sensor tab until it operates correctly.

[13] Remove the Demo Plate.

[14] Shut off the unit.

[15] Install the Main Cover.

Replacing the Erase Lamps

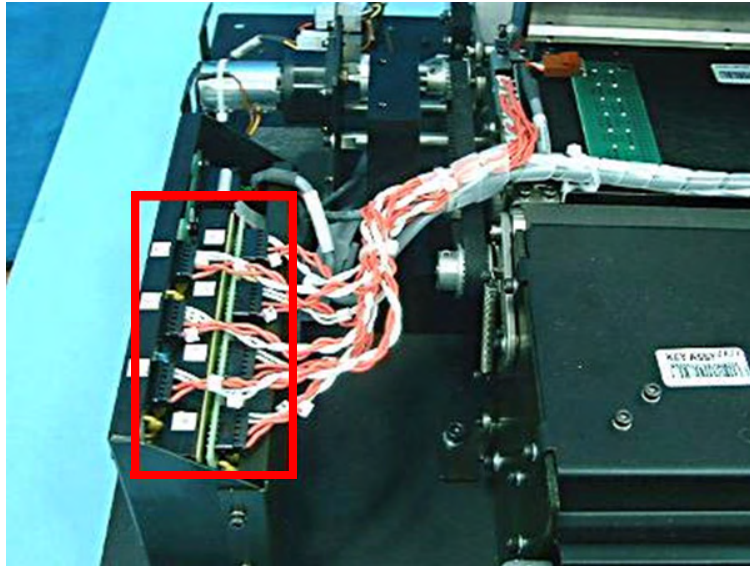


Laser Warning

To avoid possible eye damage, before operating the unit without the cover, disconnect the laser (see [“Disconnecting the Laser” on Page 35](#)). For additional laser precautions see [“Laser Safety Instructions” on Page 11](#). Only authorized personnel may remove the cover.

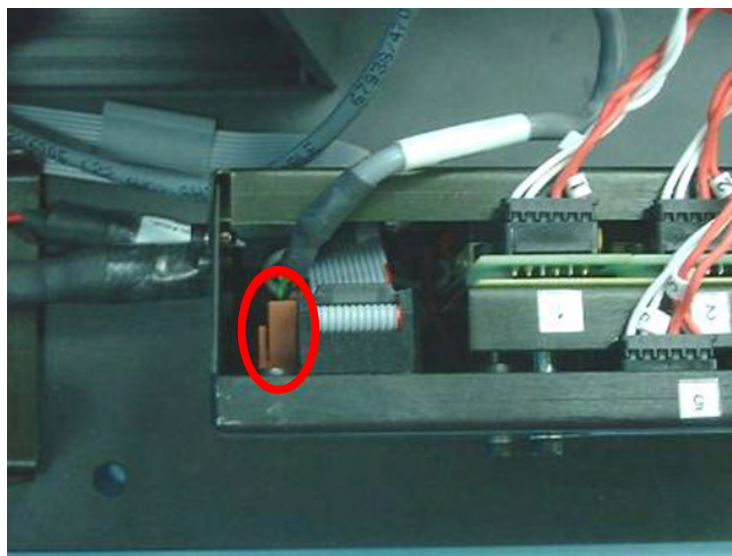
- [1] Remove the Main Cover (see [“Removing the Main Cover” on Page 33](#)).
- [2] Remove the Slide (see [“Replacing the Slide” on Page 49](#)).

Erase Lamp Connectors



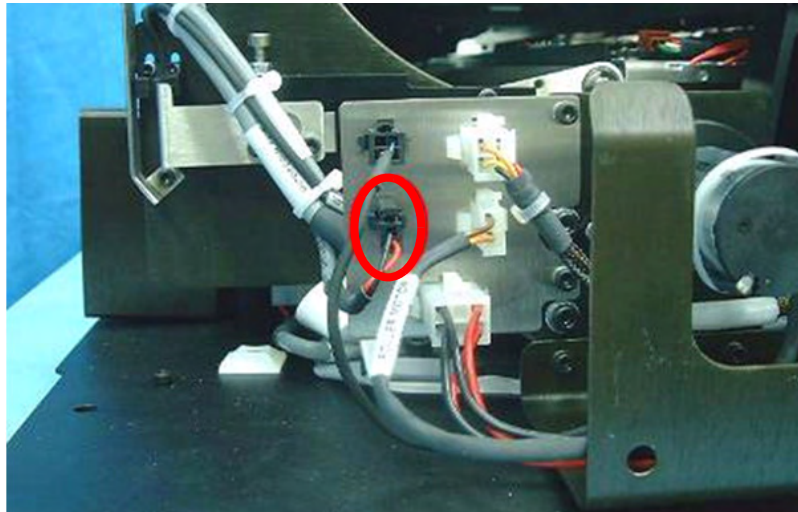
- [3] Disconnect the Lamp Cables from the Inverters.

Erase Lamp Sensor Connector



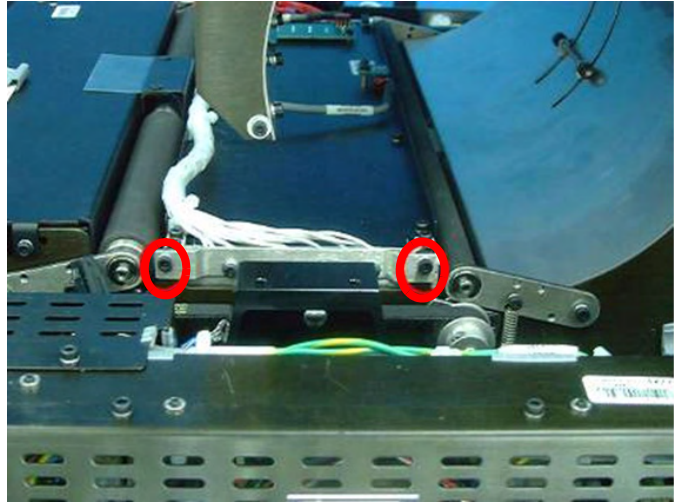
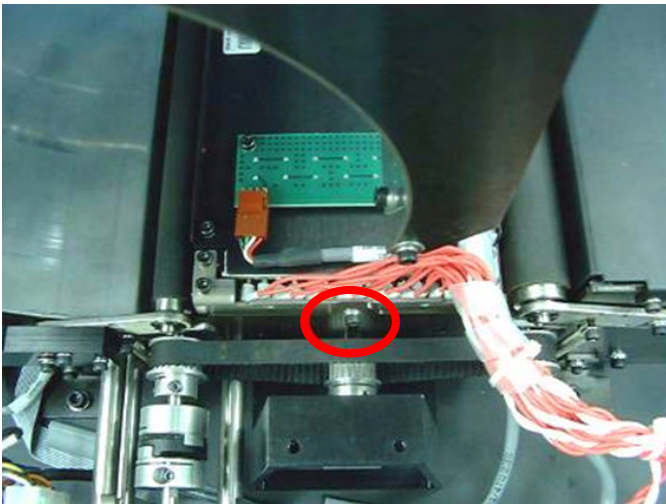
- [4] Disconnect the Erase Lamp Sensor Cable from the Inverter Assembly.

W0 Upper Sensor Cable Connector

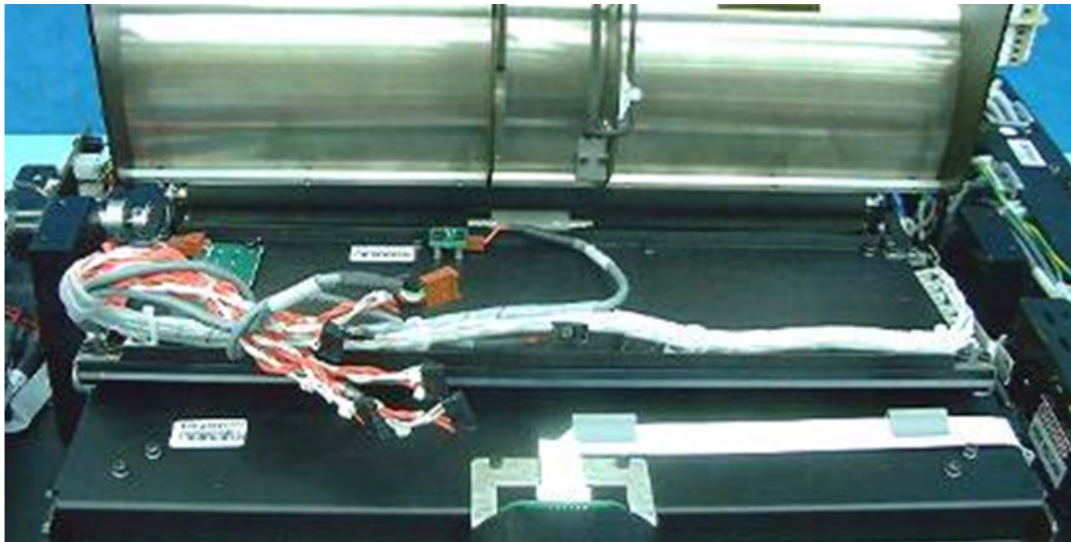


[5] Disconnect the W0 Upper Sensor Cable from the Connector Panel, and remove the connector from the panel.

Erase Lamp Assembly Screws



[6] Remove the 3 screws that attach the Erase Lamp Assembly, 2 on the left side, one on the right side.

Erase Lamp Assembly Wiring Harness

- [7] Remove the Erase Lamps Assembly through the drum front opening. The Erase Lamp Assembly includes all the wiring, as shown in the image above.
- [8] Reverse the above steps to install the Erase Lamp Assembly.

Calibration

Origin Calibration

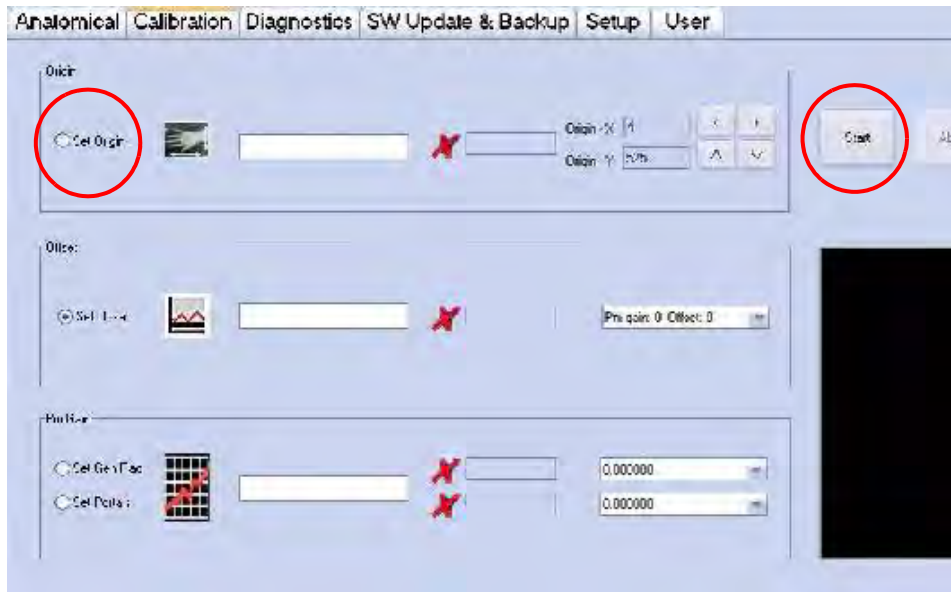


Important

The machine is calibrated at the factory before it is shipped. Sometimes it is necessary to recalibrate after a parts replacement procedure.

- [1] Enter the Kodak QC configuration screen. The code is 1331.
- [2] Click on the "Calibration" tab.

Set Origin on Calibration Tab



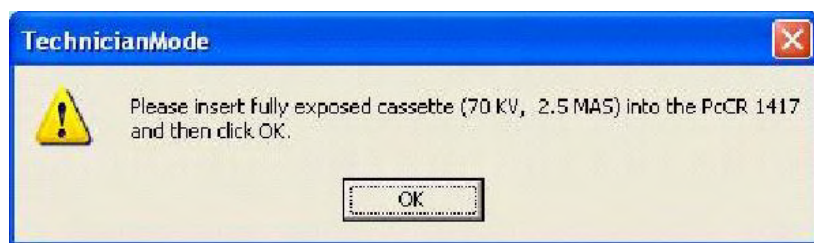
- [3] Mark the "Set Origin" option and then click [Start]. (See Figure ["Set Origin on Calibration Tab" on Page 68.](#))



Note

A message with the exposure setting for the origin calibration will appear.

Exposure Settings



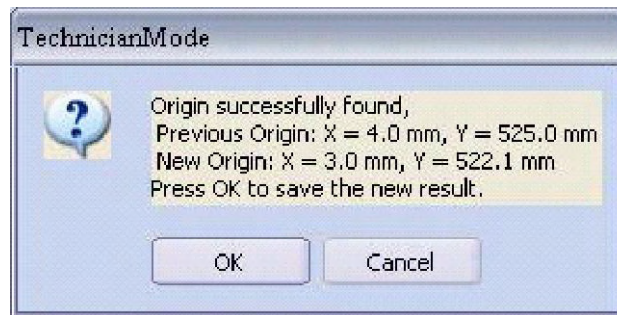
- [4] Click [OK]. (See Figure ["Exposure Settings" on Page 68.](#))
- [5] Expose the Cassette with the correct settings and insert it into the Scanner.



Note

At the end of the scanning process a message with the new X and Y coordinates will appear.

New X and Y Coordinates

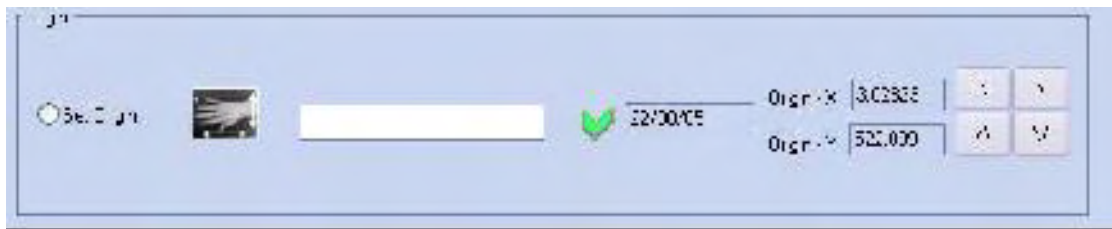


[6] Click [OK] to accept the new values. (See Figure [“New X and Y Coordinates” on Page 69.](#))

Note

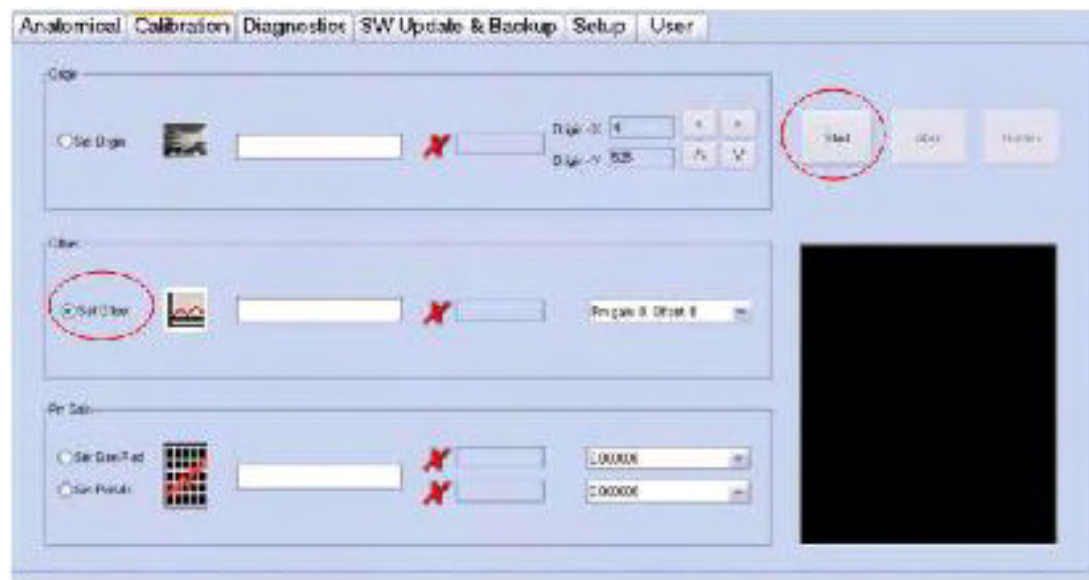
The calibration process ends and a green check mark should appear next to the Origin calibration field.

Origin Calibration Field



Offset Calibration

Selecting Set Offset



[1] Mark the “Set Offset” option and click [Start].

Note

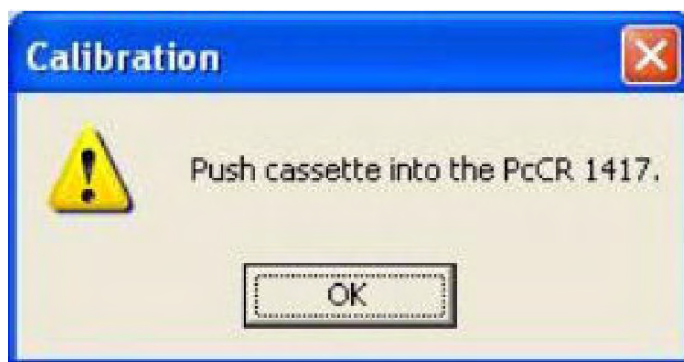
A message appears instructing you to insert a Cassette.

Insert Cassette Message

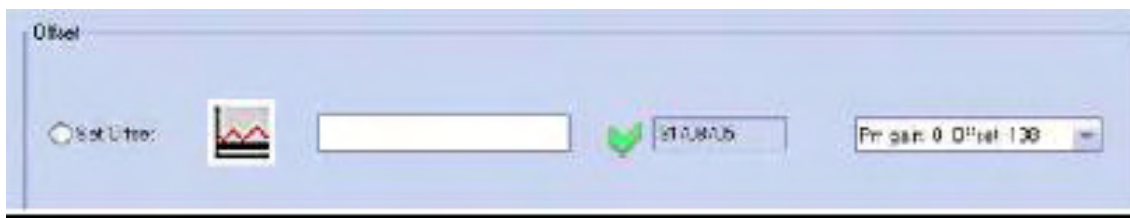
[2] After inserting a Cassette, click [OK].

Note

The Cassette will be erased. At the end of the erase process a message appears instructing you to push the Cassette again.

Push Cassette Message



[3] Push the Cassette and click [OK].

Offset Calibration Completed

[4] The offset calibration ends. A green check mark should appear next to the offset calibration field.

PM Nominal Calibration

Parts Needed:

	Description	Quantity	Photo	Catalog Number
1	1 mm copper sheet	1		
2	Calibrated Dosimeter	1		
3	CR 14"x17" Cassette	1		

Preliminary X-Ray Requirements

The Cr functions in two modes:

- X-Ray
- RT

The calibration process and the dose settings for each are different. The "14x17" exposed area must be verified for a uniform lateral exposure level of 15% at the following doses:

Application	Dose
Gen Rad--X-Ray	2.5-2.8 μ Gy
Portals--RT	400-500 μ Gy

Pre-Calibration X-Ray Setup - X-Ray Dose Adjustment

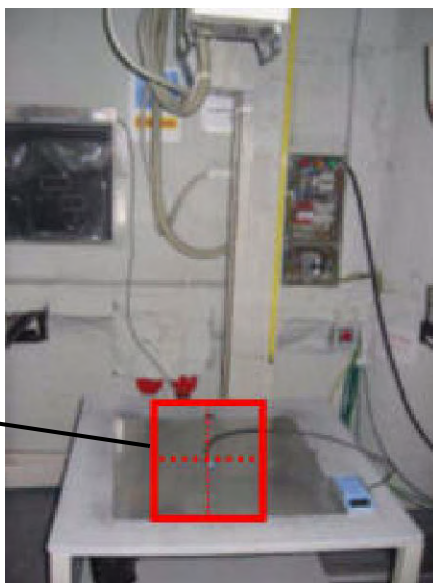
[1] Using the X-Ray machine setup panel, verify on the X-Ray monitor screen, the following parameters:

Large focal spot, SID=2.00m, 80kVp, and mAs as follows:

Application	KV	mAs
Gen rad—X-Ray	80	5 (300 ma, 17 ms)
Portals—RT	80	30 (300 ma, 100 ms)

Position of the Dosimeter

The red frame indicates the focal point of the beam.
The dosimeter should be in the beam center (cross).



[2] Slide the X-Ray source head to a SID 2.00 m.

[3] Move the table aside and clear the path for the X-Ray beam from the source down to the floor to achieve the required SID.

[4] Place the dosimeter on the floor, at the beam center.

Placing the Copper Sheet

Blocking the X-Ray beam
with the copper sheet.



[5] Place the copper sheet at the X-Ray collimator window. For RT calibration no filtration is used.

[6] Execute exposure and read the dosimeter readout. The value should be in the range of 2.5-2.8 μg .

[7] If the dosimeter readout is out of the required range slide the X-Ray head slightly above or below the nominal SID to achieve the required dose.

[8] Remove the dosimeter detector when the dose requirement has been applied.

Pre-Calibration X-Ray Setup - CR Plate Exposure and Calibration

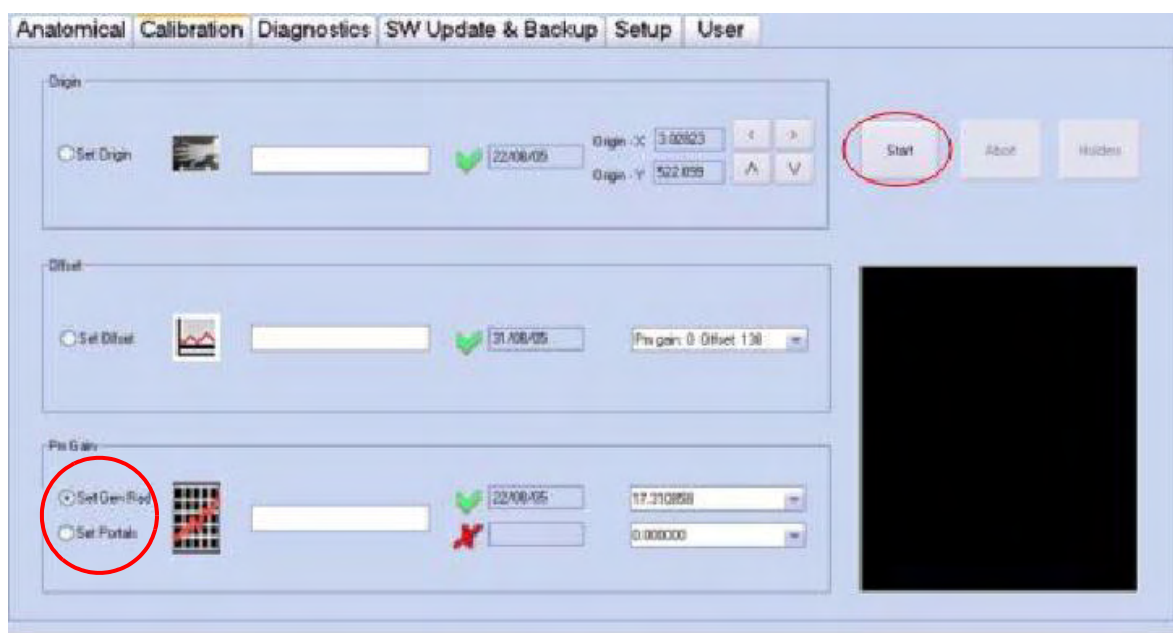
- [1] Slide the Copper Plate out of the collimator window.
- [2] Place the Cassette, loaded with well-erased CR plate, on the floor, with its center located at the X-ray beam center.
- [3] Slide back the Copper Plate to cover the collimator window. (For RT calibration, no-filtration is used.)

Note

Origin-find and Offset-find calibrations must have been performed previously as described in [“Calibration” on Page 68](#).

- [4] Expose the Cassette setup to X-ray radiation.
- [5] Enter the Kodak QC setup configuration screen. The code is 1331.
- [6] Select the “Calibration” tab.
 - (a) Mark the “Set Gen Rad” check box if the Scanner is for X-Ray use.
 - (b) Mark the “Set Portals” check box if the Scanner is for RT use.

Calibration Tab



- [7] Click [Start].

Note

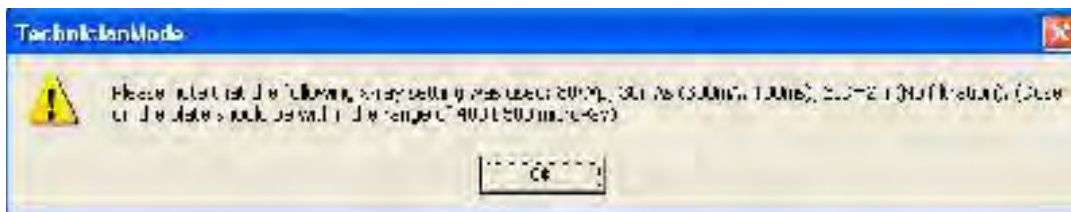
A new screen appears with the X-Ray dose settings:

- For X-Ray, see Figure [“Find PM Gain \(Gen Rad\)” on Page 74](#)
- For RT, see Figure [“Find PM Gain \(Portals—RT\)” on Page 74](#)

Find PM Gain (Gen Rad)



Find PM Gain (Portals—RT)

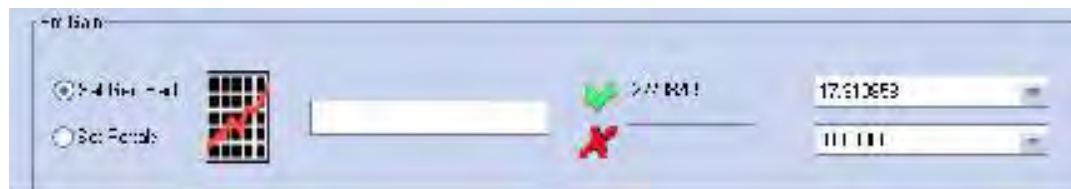


[8] Click [OK] and insert the Cassette which has been exposed with the required dose into the Scanner.

 **Note**

When the calibration process has been completed successfully, a green check mark appears next to the PM nominal calibration field along with the date of the calibration procedure.

Calibration Successful Screen


 **Note**

If the calibration was not successful, a red X appears next to the calibration field.

Calibration Failed



[9] Make sure the Scanner is not located near a window or other strong light source and repeat the calibration process.

[10] If the calibration still fails, contact Kodak support.

Section 5: Preventive Maintenance

Cleaning the Rollers

Introduction

Periodically clean the rollers to remove dust and small particles. The roller-cleaning device enables you to clean the rollers that feed the screen from the cassette into the unit.

The cleaning device includes the following items:

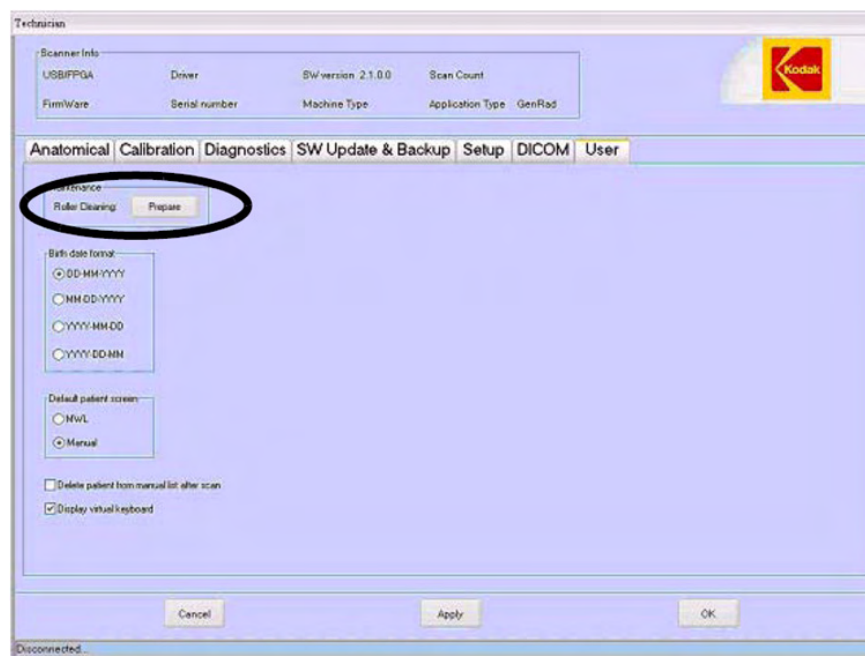
- Cleaning tray
- Cleaning plate with adhesive strips covered with protective paper/a protective envelope

Using the Cleaning Plate to Clean the Rollers

- [1] Remove any cassettes and screens from the unit.
- [2] Open the *Kodak QC* software.
- [3] In the User Interface, click [Setup].
- [4] Click [Login]

The "User" screen opens.

User Tab



- [5] In the "User" tab, click [Prepare].
The following message appears.

Insert Cleaning Tray Message

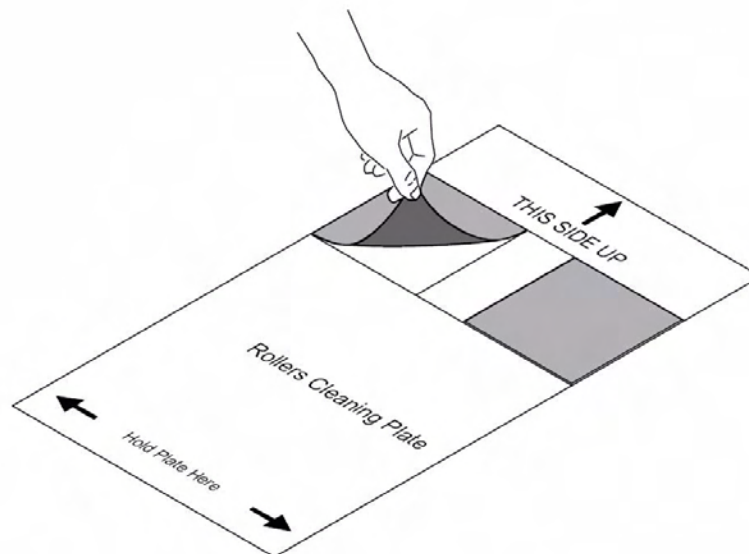


[6] Insert the Cleaning Tray, making sure that it locks in place.

[7] Click [OK].

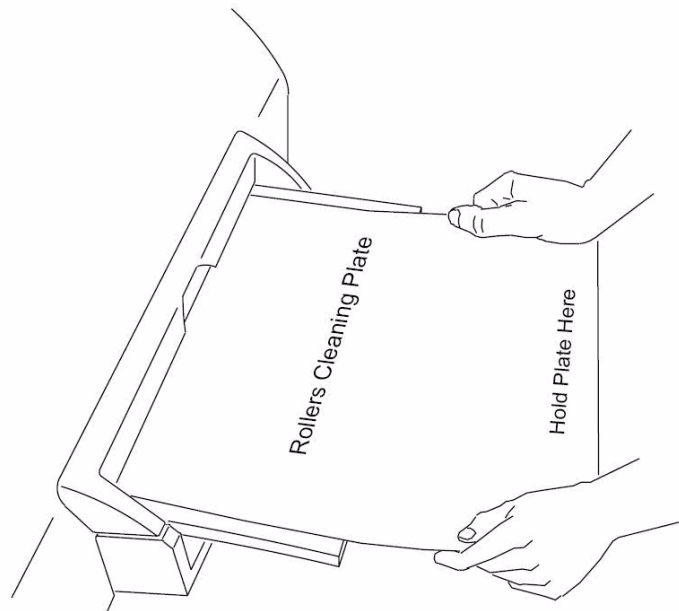
The rollers begin to turn.

Removing the Protective Strips



[8] Remove the protective paper from the cleaning plate to expose the adhesive.

Inserting the Cleaning Tray



[9] Place the Cleaning Plate on the tray. Make sure the Cleaning Plate is placed in the correct direction, as specified on the plate.

[10] While holding onto the plate, push the plate slightly into the unit. It should go in almost entirely, with approximately $\frac{1}{4}$ remaining outside

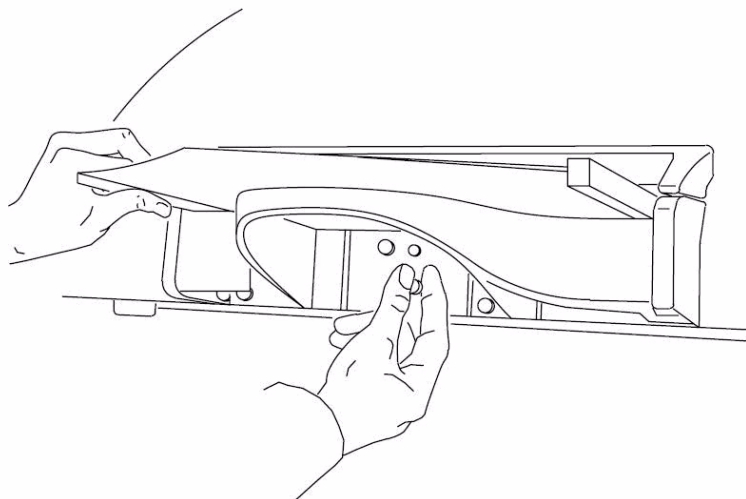
The following message appears:

Pull Out Cleaning Plate Message



[11] Click [OK] and remove the plate.

Disconnecting the Cleaning Tray



- [12] Disconnect the cleaning tray by completely pulling out the knob underneath the front tray until it comes to a stop.
The unit performs a reset (homing cycle).

Note

If the homing is not performed, turn the unit off and then back on.

- [13] Repeat the cleaning process two more times.

Cleaning the Plates

For instructions on cleaning the Plates, see the publication *Kodak CR Cassette with Flexible Phosphor Screen for Kodak Point-of-Care CR Systems* 5H7945.

Section 6: Appendix A: Service Report

Company name:		
Technician:	Name:	
	Tel. No.:	
	E-mail:	

System Information:

System SN:	
Problem reported:	
Problem diagnosis:	
Repair activity:	

Result:

--

Name: _____

Signature: _____

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